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PRACTICAL WINERY & VINEYARD

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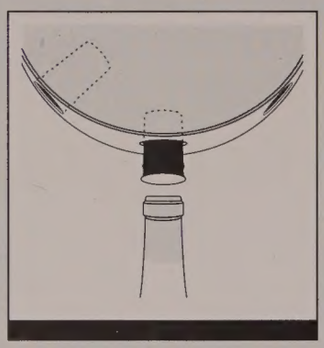

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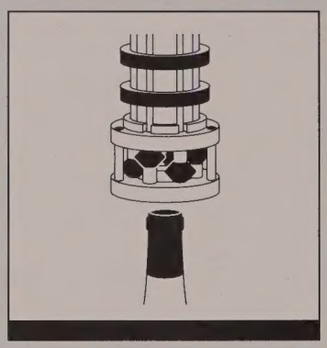

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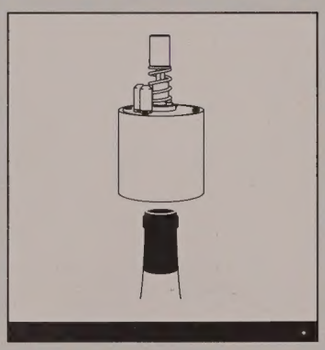

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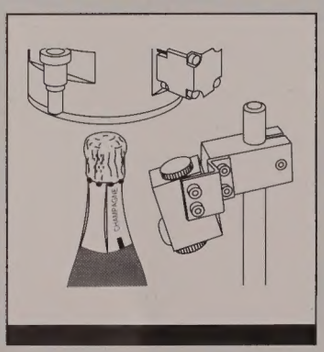

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Crimson clover in bloom

Domaine Chandon first planted a cover crop in this sloping (more than 15%) 5-acre Carneros district Chardonnay block in 1989. "A permament cover crop was initially selected to prevent erosion and hopefully to help balance the vines," says Ann Kraemer, vineyard manager (Napa, CA).

In the fall of 1989, after vine planting, 40-lbs/acre of Blando Brome seed was drilled between the vine rows. The soil is Haire clay loam (previously pasture land) with variable soil depths to three feet. An aerial application of 250 lbs/acre of calcium nitrate fertilizer was made to help establish the cover crop. There was noticeable competition between the vines and cover crop in 1990 and 1991.

In 1991, third leaf vines yielded ½-ton/acre of grapes. After the 1991 harvest, a new cover crop mix (20% creeping red fescue, 20% blando brome, 20% crimson clover, 15% nungaren sub-clover, 15% Mt. Barker sub-clover, and 10% hykon rose clover) was drilled at 25-lbs/acre over the existing thatch.

(The cover photo was taken in spring, 1993 before the clovers went to seed.)

During the 1993 season, the first mowing (set at six to nine inches height) occurred in mid-March to knock down grasses, thereby encouraging growth of the clovers. The clovers were allowed to go to seed. The second and third mowings were set at three to four inches height, to not disturb the thatch.

In late May-1993, every other aisle was disced to reduce cover crop competition. 1993 grape yield was 5.38 tons/acre. Following the 1993 harvest, a cover crop mix of 40% perennial grasses and 60% clover was drilled into the disced aisles to re-establish a permanent cover.

Kraemer reports no frost problems. The cover crop discourages morning glory, there has been a decrease in mite and leafhopper pressure, and no apparent increase in gopher population.

Based on this and other trials, Domaine Chandon has developed a potential strategy to manage future Carneros plantings: A winter cover crop of oats, peas, and vetch will be planted in the fall and disced in the spring for the first three or four years. This will decrease competition while vines develop. A mix of clovers and grasses will then be planted as a permanent cover in the producing vineyard and mowed three times/season. One exception to this strategy will be steep or unstable soils that require a permanent cover from the outset. ■

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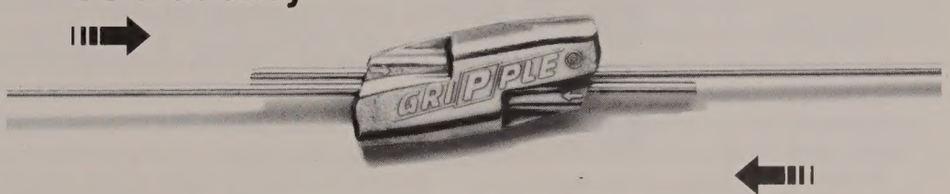

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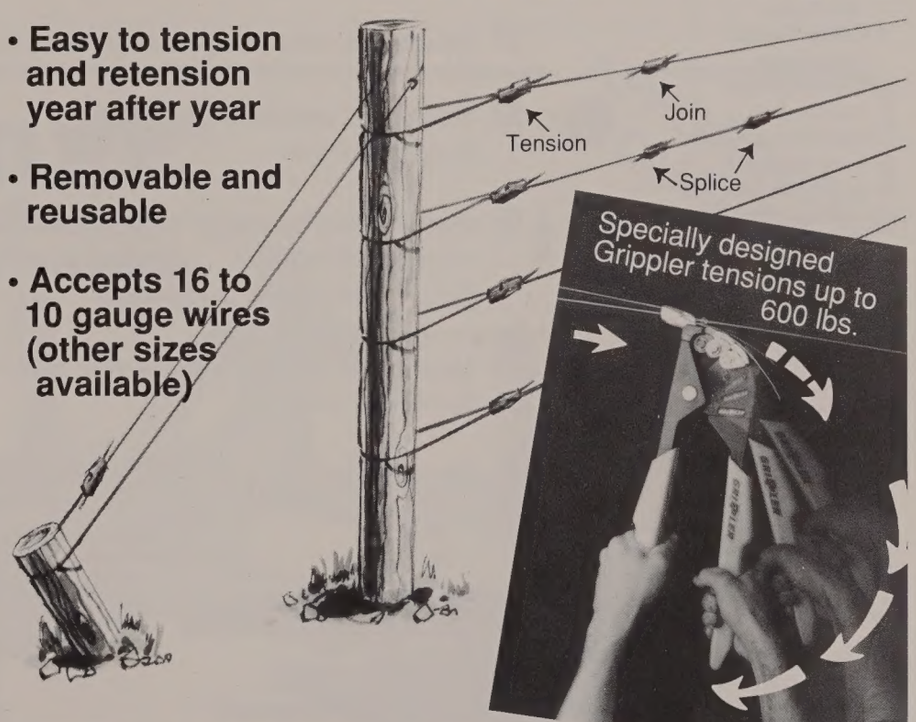

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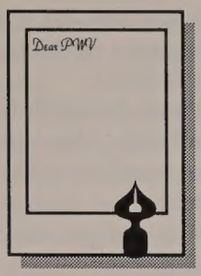
Photo *by Scott Clemens*



Dear *PWV*:
With all the current winewriter and consumer attention being focused on Zinfandel, your two-part report on the variety ("Zinfandel — the Affordable Luxury") was well-timed and for the most part, on target. There are a great many of us who would like to help boost the Zinfandel revival.

However, in your survey of grapegrowing areas I fail to understand how you could overlook the Lodi-Woodbridge region, which is responsible for nearly 40% of the state's Zinfandel production. This region has a long and proud history of making Zinfandel wines, with some vineyards in the region dating back to the turn of the century.

As the author pointed out, even the best Zins are reasonably priced. To further popularize the variety, attention should be drawn to even more modestly-priced Zins in the $6 - $9 category, many of which come from Lodi. Lucas, Las Vinas, and Robert Mondavi Wood-bridge, among others, have worthy offerings in this price range.

I submit that "the affordable luxury" is most affordable in Lodi.

Sincerely,
Mark Chandler, Executive Director
Lodi-Woodbridge Winegrape Commission

Dear *PWV*:
I recently paid a visit to Placerville, CA, partly for business and partly for pleasure.

I live in Nevada and needed to meet with clients from the Central Valley, and Placerville seemed a likely halfway point. We patronized a local restaurant and several shops while there and have sent $10 to the city coffers because of overlooking the two-hour parking limit in the downtown garage. All of this (the parking fine excepted) was pleasant and charming. Placerville is generally welcoming to visitors, which I'm sure it wishes to be.

But my friends and I were offended by the fact that the first thing we saw on Main Street after leaving Highway 50 was a giant sign on the Public Safety Building reading: JUST SAY NO TO DRUGS AND ALCOHOL.

Now I'm smart enough to know what the folks behind that message intend for it to mean, but this Nancy Reagan-era slogan has never successfully communicated what it should have, and it should have been retired along with Mrs. Reagan.

Should I say no to all drugs? Should I say no to life-saving antibiotics because of this all-encompassing slogan? Should I refuse to drink coffee, tea, and cola because they contain caffeine? Should I not take aspirin or ibuprofen when I'm in pain? I suppose I should have declined that morphine after my cancer surgery?

Just say no to drugs is a stupid slogan. A slogan should say what it means. Could it be, "Just say no to cocaine," or "Just say no to

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heroin"? Or maybe it's 'crack' or 'pot' or LSD that they mean, but surely not penicillin.

"Just say no to alcohol" is even more stupid and offensive than "Just say no to drugs," especially in a county with a burgeoning wine industry that is earning El Dorado County a national and international reputation.

Surely the folks sponsoring the sign don't intend for us to "Just say no to Boeger, Sierra Vista, Lava Cap, Jodar, Gold Hill" and all the other vintners and grape growers in El Dorado County.

Let's see, maybe they want us to say no to the alcohol in the communion chalice, or to that used to sterilize the needle in the doctor's office, or to the one-half of one percent that's usually found in fresh orange or apple juice. Maybe it's the alcohol in many cosmetics or that in many prescription and non-prescription medicines.

What they probably mean (at least we hope the sign sponsors aren't advocating the total elimination of everything containing alcohol) is just say no to alcohol abuse, which is another matter altogether and not what the slogan says at all.

Tying legal, healthful beverages containing alcohol (and especially wine) to the street drugs that are implied in the slogan is a disservice to the public.

Just because a small segment of the public abuses these products of nature is no more reason to deny them to the majority than to deny the majority the use of an automobile because some folks drive fast and reckless.

"Just say no to abusive drinking," would be a responsible thing to say. Or "Just say no to driving drunk."

Saying no to all alcohol, even in beverages would be a very bad idea. Study after study, from Harvard Medical School, the French Institute of Health (the famous "French Paradox"), Kaiser Permanente in Oakland, CA, and too many more institutions to mention (I'd be pleased to provide a list) have proven that drinking in moderation reduces heart disease by up to 40%. It's also a scientific fact that moderate drinkers live longer than teetotalers and much longer than abusive drinkers.

Surely Placerville's slogan sponsors don't mean to mislead, destroy their agricultural industry, or shorten my life.

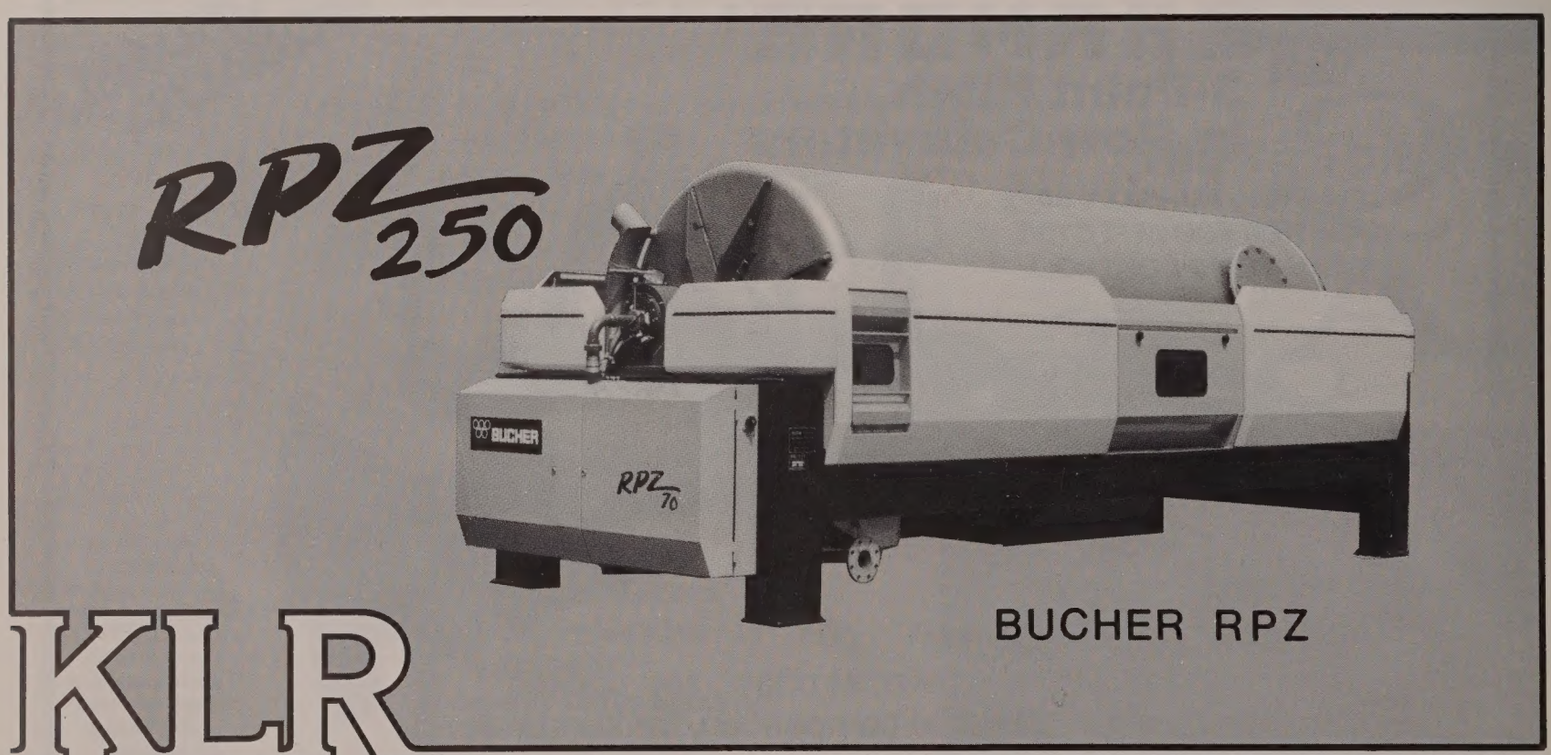
Please take down the slogan. It either sends a message it doesn't really mean, or if it means what it says it's even worse, because it advocates a return to Prohibition.

I remain offended,
Jerry D. Mead, Editor/Publisher
The Wine Trader Magazine
(edited/reprinted from ***The Wine Trader,*** Vol.N, No.6.)

Dear Don,

I am sure I speak for all of us who had the chance to meet with you one-on-one at the annual Texas Grapegrowers meeting or to watch your masterful moderation of the panel and attendees at the seminar entitled, "Tasting to Maximize Quality." Many, many thanks for stepping in on short notice to share your vast experience with us, and to give us the opportunity to meet the man behind ***Practical Winery & Vineyard,*** one of the industry's best trade publications.

About five minutes into the seminar, I realized that we were experiencing, in person, the style of wine evaluation sessions that leap from the pages of your magazine. You said later that these frank, but gentle, evaluations of each other's wines by fellow winemakers depend on their willingness to be honest and to accept the criticisms of their



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wines, and that is no doubt why your articles come across so loaded with detail, pride, and clarity.

What made the seminar work, Don, and what makes your magazine work, is your leadership ability. Everyone on the panel was asked to speak out about each wine, yet no one person dominated. Anyone from the audience could offer comments, but no one felt on the spot to do so.

All in all, we were enriched by your visit, and we hope you'll come back soon. Please stay in touch, as we feel strongly that Texas wines are getting better and better, and we all have many good stories to tell.

Sincerely,
Anne Welch
Messina Hof Wine Cellars/Vineyard
Bryan, Texas

Dear Editor:

I would like to apologize to my friend Bill MacIver, and any other Century Council supporters, who take offense to being called 'dupes.'

Of course, that means they knowingly support ALR (Automatic License Revocation), which takes due process and throws it out the window, making the officer in the field, cop, judge and jury.

I also find it interesting that so many wine industry members are lending their good names to an organization financed by the same folks (primarily distillers) who have once again been preaching 'alcohol equivalency taxation' in the halls of Congress.

As to the alternative, wine people should point out that "Wine is the solution, not the problem." While statistics show that only the smallest fraction of drunk drivers are wine drinkers, but the wine industry allying itself with the industries which do cause the problems, the problem rubs off on wine. I've used the metaphor before, but it's especially fitting here, "Go to bed with dogs, get up with fleas."

As to my being in the company of the 'skidrow wine producers' on this issue, that's the rough equivalent of my calling MacIver's allies 'booze merchants,' name calling that is neither totally accurate nor likely to resolve the real issues surrounding wine's embracing The Century Council. I can't help pointing out that not many skidrow derelicts can afford to drive anything, drunk or sober, so at least they aren't part of the drunk driving problem.

I prefer to think I'm on the side of wine holding itself separate from the industry that led us down the primrose path to Prohibition just 60 years ago, that continues to try to screw us tax-wise at both the federal and state levels, and on the side of freedom-loving, Constitution-respecting, American citizens in and out of the wine industry.

MacIver and all the others supporting Century Council, which claim ALR is so effective, should ask why the state of California, in the year it instituted both ALR and .08 permissible blood alcohol, had statistics no more improved than the national average?

ALR does not improve drunk driving statistics and should be dropped by the industries as a tactic to be supported. What might work is graduated punishments, with heavier fines and jail sentences for the very drunk driver and the recidivist. Hell, put them in front of a firing squad at .30 BAC, if they have been fairly tried and convicted, but don't let a cop make that decision in the field.

Standing firm,
Jerry Mead

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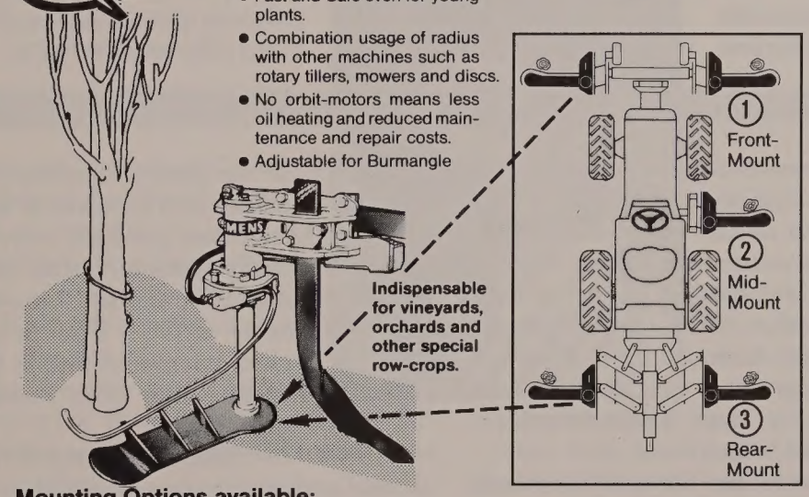

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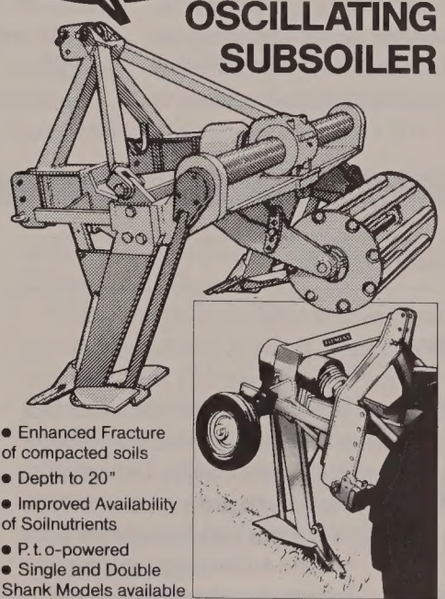

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Syrah in the southern Côtes-du-Rhône

Translation/Introduction by Robert W. Mayberry

For consulting oenologist Bruno Sabatier, 1993 was a year of records: his 50th birthday and first trip to the U.S., during which he discussed Syrah at the fourth UC-Davis Extension short-course, coordinated by John Buechsenstein, on "Rhône Varietal Production in California." His talk was translated for the course and edited for **PWV** by this writer.

Though most conference attendees had not met Sabatier, many followers of Rhône wines in the UC-Davis audience had already tasted results of his work. Among his more than 50 southern Rhône clients, Sabatier counts Bour in the Coteaux du Tricastin, Klein in the Côtes-du-Rhône, Steinmaier at St.-Gervais, Couturier at Cairanne, Sinard at Valréas, the Comte de Régis in Lirac, Chapalain in Gigondas, and André in Châteauneuf-du-Pape.

Sabatier became an independent consultant following a six-year stint with the lab of the producer's *Syndicat* of the Côtes-du-Rhône. This was during the time, referred to in the 'History' section below, when Syrah was 'imposed' by wine officials in the southern Rhône. Before that, he took his *Diplôme d'oenologie* from the science faculty at the University of Dijon, following two years at the Beaune viticultural school with Max L'Eglise.

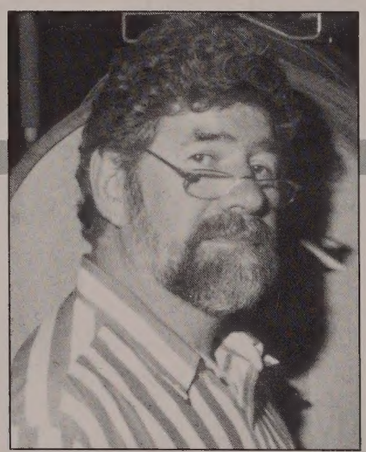
In a course that necessarily covered northern Rhône Syrah as well, it was Sabatier's job to speak of Syrah in the southern Rhône. In fact, the south may present more analogies of climate and circumstance to California than does the north. These include tremendous expansion of vineyard planting since WWII, with the need to discover or rediscover, after phylloxera and other disruptions, which of several varieties do best where.

Roles of Syrah

Syrah plays quite different roles in the northern and southern parts of the Rhône valley.

In the AOC (*appellation d'origine contrôlée*) wines of the north, Syrah plays a single role. Although it is the only permissible red *cépage* (grape variety) of the whole region, its wines are neither thought of nor labeled as varietal, but simply with the AOC. The use of Syrah as the only red *cépage* highlights variations among the wines produced by the sites where they are grown.

In the south, Syrah plays a double role. As one of numerous permissible red *cépages*, it is in the 'primary' list on all levels of AOC. Yet, as Sabatier explains, it is here that Syrah has sometimes been used by itself in wines labeled both with the AOC and the varietal name. More commonly, its role is as an 'ameliorative' *cépage* in assembled wines labeled only with the AOC.



Bruno Sabatier

By Bruno Sabatier

History

Syrah's presence in the southern Côtes-du-Rhône was relatively limited at the beginning of the 1960s, and Syrah did not offer economic advantages encouraging its development.

Several parcels existed, in particular at Châteauneuf-du-Pape and on several properties of the Gard, the Vaucluse, and the Drôme. But no pure Syrah wines exist from this era that would allow us to have an opinion of them.

The southern Côtes-du-Rhône 'brand-name' had not yet acquired its noble image on the market. In the Vaucluse and Drôme, the dominant *cépages* were essentially Carignan and Grenache. In the Gard, the diversity of *cépages* was more notable, and you could find Counoises etc. for the red wines and Aramon in the vineyards not classified as Côtes-du-Rhône.

Variations in quality were brought out by the different *terroirs*; and from the slopes of Rasteau and Cairanne to the plains of Sainte-Cécile, Valréas or Chusclan and Saint-Victor-la-Coste, yields could range from 35 to 120 hectoliters per hectare (two to eight tons/acre).

In the same proportion, the qualities and richness in alcohol of these products were extremely variable, but all could benefit from the Côtes-du-Rhône AOC. The wines lacked harmony, and it was obvious that they needed improvement.

In effect, on the slopes, high alcohol and overripeness were often the dominant characteristics. On the plains, where Carignan dominated, the wines were harder, more rustic, and lacked nobility. Measures promoting qualitative advancement clearly had to be taken if you wanted the Côtes-du-Rhône wines to find a significant place in the French wine market.

The authorities at the time, the INAO

Origin and terroir

Under the French system of AOC, a wine's identity is perceived to come from the place of origin and its *terroir* (natural conditions, habitat). In general, 'original' characteristics of the wines are considered more important than varietal characteristics. They are what give the wine its *typicité* (truth to type).

Besides the area of production, the concept of origin in AOC includes the legally permitted *cépages* and all agricultural and technical factors of production believed responsible for the wine's *typicité*.

Besides soil, *terroir* refers to all the other natural conditions of a growing site — including climate, terrain, micro-climate, and subsoil — to which the local grape varieties have been adapted by both natural and cultural (scion) selection.

In each *terroir*, certain varieties will fare better than others, including differences in their capacity to express origin. Perception of its success at expressing local origins helps explain the narrowing to Syrah and to certain populations of Syrah for the better part of 2,000 years of cultural selection in the northern Rhône.[1]

Rhône AOCs

Three tiers of quality are indicated by the specificity of a Rhône wine's AOC. First comes the 80% or so of the wines that may use only the name of the whole region, Côtes-du-Rhône. Almost all of these are southern.

A second tier comes from a select group of villages, or sectors within them, that have the AOC Côtes-du-Rhône Villages. The names of 16 of the villages may accompany the Villages AOC on the label. 'Villages' is exclusively a southern category.

The word *cru* (growth) is not official, but is informally and customarily used to refer to wines in the third tier — a wine that may use its own name by itself as an AOC. Apart from fortified wines, there are eight of these local AOCs in the north,[2] and five in the south.[3]

The northern Rhône

Except for Crozes-Hermitage, winegrowing in the northern Rhône is almost entirely confined to the steep, south slopes of granitic bluffs within sight of the Rhône river. In a continental climate, the vineyards, which often have to be terraced, require this exposure for the best ripening conditions.

The names of these sites (*lieux-dits*) often accompany the AOC on the label. Their steepness (grades of up to 60°) imposes such arduous conditions of labor upon the many small grower/winemakers (*vignerons*) that the wines can't help but be 'hand-made' (some *vignerons* now band together to hire helicopters for treatment sprays).

The northern Rhône produces almost nothing but *crus*. Market prices reflect their rarity. Even before the recent addition of Vacqueyras to the list of southern 'growths', the northerners represented only a quarter of the 12% of Rhône production that was in local AOCs.

The southern Rhône

The vast majority of Rhône wines come from the south. Winegrowing here spreads far from the Rhône onto the sandy limestone soils of broad, stone-covered plateaus and up the rocky slopes along tributary rivers.

Although some make pure Syrah, tradition in this mediterranean climate calls for southern Rhônes to be assembled from several complementary grape varieties for balance. For the same reason, the wines are usually assembled from several growing sites within a *cru*, named Village, or region (all three levels of AOC are present in the south).

The supply of wine is abundant. Market prices often undervalue estate-grown and bottled wines, so it is important to remember that even a wine with the regional Côtes-du-Rhône AOC can be a source of origin-specific wine when made by a 'proprietor' (limited by law to making wine from grapes of his or her own production). □

[1] 'Best' *cépages* must be judged in relation to terroir. Sabatier was consistently impressed with the quality of old-vine Carignanes he tasted on his tour of Rhône-style producers in California, leading him to suggest that, in these cases, Carignane was a better *cépage* in California *terroirs* than in many of its French *terroirs*, where it often has difficulty ripening sufficiently.

[2] Côte-Rôtie, Condrieu, Château Grillet, St.-Joseph, Cornas, St.-Péray, Hermitage, Crozes-Hermitage

[3] Gigondas, Vacqueyras, Châteauneuf-du-Pape, Lirac, Tavel

(National Institute of Controlled Names of Origin) and the *Syndicat* (of producers), got together to impose the *cépages* called 'ameliorators,' which already existed in the region in a minor way — Cinsault, Mourvèdre, and Syrah — for new plantations.

The objective was, by encouraging a big supply [of them], to give Côtes-du-Rhônes a more attractive and harmonious personality.

However, certain producers took advantage of the idea of commercializing these *cépages* 'pure' and produced wines of remarkable quality, thus provoking the anger and jealousy of those who had not made the effort to plant ameliorative *cépages*. This is the origin of a change in the Côtes-du-Rhône roles forbidding mention of varietal names on the bottle and almost certainly, it is feared, the bottling of pure varietal (AOC) wines.

Major development of these plantations was not immediate since the clones lacked productivity. Unlike Grenache and Carignan, long pruning to assure yield required installation of trellising that was not very frequent in our region at that time.

Since then, research and development on clones has permitted us to obtain productive Syrahs, cordon-pruned and trained on one wire, but is the final quality what was hoped for at the beginning? This is far from being the case!

The wines

After 25 years what can you say about the wines?

The whole gamut of quality in Syrah wines is produced in the southern Côtes-du-Rhône.

These range from light wines of no particular personality from heavy yielding young vines (70 hectoliters/hectare [approximately five tons/acre] or more), to rich, expressive wines with characteristics affirmed at yields around 35 to 45 hectoliters/hectare (two+ to three tons/acre) and plantation densities of 3,500 to 4,000 vines/hectare.

Three levels of quality are observable (from healthy grapes of course):

1) Dilute wine, of pretty color, not very intense at 10% to 10.5% alcohol. Table wine [in the European sense, *vin ordinaire*], fine and elegant.

2) Balanced wine, color ruby, very vivid with touches of violet, aromatic characteristics affirmed on dominant veg-

etal notes, high strung. Quality tannins, but angular. This is, for me, the very essence of a *vin de cépage* (varietal wine), because the powerful expression of the *cépage* dominates.

3) Powerful wine, somber colored, almost black, intense, deep. Rich, complex aromas of fruits, licorice, violet, concentrated tannins, very expressive wines at the limit of astringency. Very long in taste, capable of harmonious maturation which develops very noble smoke and fruit characteristics. This is what to aim for when the potential of the *terroir* dominates the aromatic vigor of the *cépage*.

Climate

The climate of the Côtes-du-Rhône is of the Mediterranean type, that is to say, hot, dry, and sunny. Periods of precipitation are rare, abundant, and brief.[1]

Temperatures during the vegetative cycle can be elevated (25°C to 30°C or 77°F to 86°F) or else strongly lowered (to 15°C to 20°C or 59°F to 68°F, in June and July) by the mistral, a cold, dry north wind.

The climatic characteristics that produce great vintages are:

- A stock of water built up over the winter or big rains in April.
- Heat.
- Rains or thunderstorms (at least 50mm) around the 15th of July and the 15th of August.
- A dry, bright end of season, with moderate temperatures.

For Syrah, budbreak always seems slow and difficult. The reserve of water [in the soil] and heat are very important at the start of vegetation.

From flowering on, the development is rapid and abundant if the soil is too rich (water, fertilizer, heat, deep soil). Vegetative growth is excessive, and the vine behaves like salad, producing vegetal mass and no fruit.

Conversely at the moment of veraison, the soil must be well supplied with available water, but without excess, and in line with the soil's capacity to retain it (no problem on clay soil, delicate on soils that are sandy and too well-drained).

- In effect, drought during veraison provokes a phenomenon of scalding and a blockage of maturation.
- Too much water at veraison provokes swelling of the berries, dilution of the sugars and acids, diminution of color and aromas, all the more when the preceding period has been too dry.
- Between flowering and harvest, 100 days is average, but climatic variations can make this period vary. The date of budbreak is more irregular but, in general, this has no effect on the flowering. It is, above all, the temperatures during the month of May that influence the date of flowering.

Viticulture

The soils are fundamentally different from the northern region. We pass from granitic soils (in the north) to soils that are generally rather deep clay-lime.

Cultural habits are also different as a result of plantation densities (around 50% fewer vines per hectare), from which

[1]Translator's note: it should be remembered below that AOC regulations in the southern Rhône, with a few very restrictive exceptions, require dry farming.

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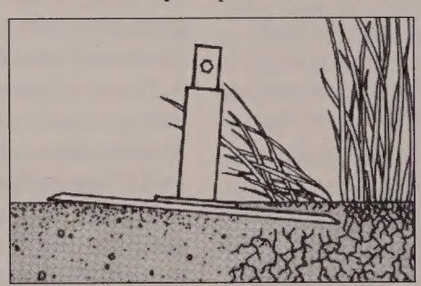

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Culture should limit vegetative expansion and production of wood because too vegetative a vine would produce wines in which herbaceous and vegetal characteristics predominate. Soils poor in water are thus necessary. However, at the moment of veraison, even a slight drought is very prejudicial to maturity, and if the crop is a little too heavy, scalding and blockage of maturity are very probable.

The choice of soils and microclimates good for culture of the vine in the Rhône Valley should follow several principles. But the choice can be made as a function of two inverse considerations:

- On terrain 'X,' with what *cépage* would I have the best results?
- I want to plant Syrah: what terrain to choose?

Soils and microclimates in the Rhône valley vary a lot:

- Vineyards on the plain: Ste. Cécile, Plan de Dieu, Suze la Rousse and Tulette, St. Victor, Chusclan, etc.
- Hillside vineyards.
- Vineyards on plateaus or high slopes (above 250 m).
- Rhône valley vineyards in the northern part of the south.
- Vineyards in the east-west running valleys of the Rhône tributaries.

Diversity on the level of soils is also clear; in general clay-lime is dominant. But siliceous-limey and siliceous-clay soils are frequent.

The presence of *cailloux roulés* (rolled 'pebbles,' rounded cobblestone-sized), silica-based, or of limestone rock gives different structures to the soil.

Cultural methods — tilling or herbicide, fertilizer spread on the surface or localized — provoke a more or less balanced occupation of the soil by the roots.

All microclimates are capable of being planted with Syrah except the zones that are too arid and scorching and the cold zones with deep, humid soil. It is evident that to each microclimate corresponds an aspect of the wine. At this level, the possibilities of variation are infinite, and in all their subtlety, the nuances of the wines will be infinite, too.

Harvest

Here is the fundamental point, the choice of maturity level is going to permit [us] to express the quality of the product and to bring out all the efforts made on cultural methods.

1) Evolution of the richness in sugar and the fall of acidity should follow the regular curves. Slowdowns, dilutions, and resumption of activities due to weather conditions (rain or cold) are prejudicial.

2) The maturity should be regular and homogeneous on all the elements of the bunch and the plant (berry, seed, stem, cane, leaf).

3) You should not see any withering of the bunches, but on the other hand, a slight onset of overripeness is preferable to underripeness. In case of too low a

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temperature at the moment of maturity, a certain level of overripeness is, in my opinion, propitious for great quality (a consideration uniquely pertinent to low yields). In case of big yields, the fall of acidity and the onset of overripeness will give wines without perceptible aromatic characteristics and there is a strong possibility that the color will be unstable and weak.

We notice that for big yields (around 60 to 80 hectoliters per hectare, four to six tons/acre), which you often run into on young vines, the best maturity seems to be located between 10.5° and 11° potential alcohol and 4.5 to 5 total acidity (expressed as sulphuric; 6.75 to 7.50 g/liter, expressed as tartaric).

At this level, the color is lively, of moderate but sustained intensity, and the aromatic qualities tend to be fruity and vegetal.

Vinification

Different arrangements are envisaged as a function of yield.

For harvests of low yield (35 to 45 hectoliters per hectare) and full maturity:

- Destemming is not imperative, but you have to avoid even the slightest 'grinding' of the stem. Sulphuring is indispensable at 5g (50 ppm) of SO_2/hectoliter of eventual juice and rapid yeast inoculation with a 'pied de cuve' (starter culture) of indigenous yeasts. Ideal temperature 28°C to 32°C toward the end of fermentation.
- Drawing-off after two to three days below 1000 density (avoid letting cool on the marc), 'bleed' with a light aeration and assemble the wines of the first press, to the extent that the equipment for pressing is ready for it.
- The first racking should take place soon to eliminate the gross impurities (five to ten days after drawing off). The wine stays on the lees after that to undergo malolactic fermentation at a temperature around 18°C (64°F).

For harvests from high-yielding young vines:

- Destemming seems indispensable to me, vinification at 28°C (82°F) to 30°C (86°F) maximum.
- Drawing off between 1000 and 1010 density; fermentation should finish 'in clear juice' at a controlled temperature of 24°C to 26°C (75°F to 79°F). Press wine should be stored separately and assembled later after tasting.
- The first racking should take place as soon as possible with light aeration, but without sulphuring in order not to hinder malolactic fermentation. Storage temperature of 18°C to 20°C (64°F to 68°F) for the malolactic.

Syrah and the other cépages

Syrah is undoubtedly a quality-enhancing contribution in assemblage with the other *cépages* of the Côtes-du-Rhône. The most complimentary result is obtained with Grenache in the measure of 15% to 50% according to the wines you start with and your objective.

An assemblage which seems very expressive to me is 60% Grenache, 30% Syrah, and 10% Cinsault.

The assemblage of Grenache ⅓, Syrah ⅓, and Mourvèdre ⅓ can also give great wines. But in this case, the three *cépages*

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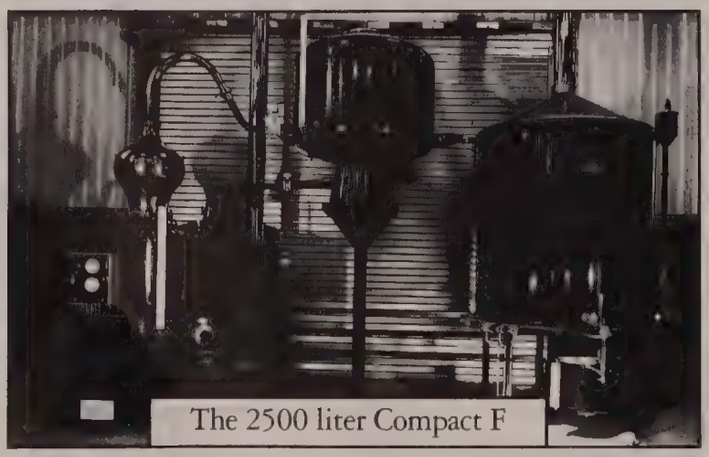

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must already be 'complete' wines, able to stand on their own.

Should you vinify the different *cépages* together or separately? My response is a clear yes [to co-fermentation]; however it is rarely possible because the technical qualities of the grapes often require different vinification methods.

In the case of quality grapes ripe at the same time, co-fermentation permits the exchanges and balances right away that you look forward to obtaining from the assemblage of finished wines. The marriage is more complete.

Impact of Syrah on assemblages

The most perceptible contribution is that of color intensity, often feeble in Grenache and Cinsault. The nuance is also much more ruby. Syrah's resistance to oxidation and slow maturation permit an improvement in the staying power of the other *cépages*.

On the level of the quality and nobility of the tannins, the contribution of Syrah is evident. With Grenache, the balance of structure is very complementary.

Aspects of Compensation

This comparative table permits a calculation, according to the type of wine you want, of the effect of Syrah on an assemblage in the southern Rhône.

	Grenache	Cinsault	Syrah	Mourvèdre
Color (if low)	ø	-	+	+
Acidity (if low)	-	-	+	+
Tannin (if low)	-	-	+	+
Alcohol (if low)	+	-	-	-
Fat (if low)	+	+	ø	ø
Aromas (if low)	ø	ø	+	+
Finesse (lack of)	ø	+	ø	ø
Oxidation	-	-	+	+
Rapidity of ageing	-	-	+	+

Key: in an assembled wine, the cépage marked
+ (compensates for)
- (discompensates for)
ø (neutrally affects)
the state of quality listed at the left.

Conclusion

In the southern Côtes-du-Rhône, it is possible to obtain great wines in which the majority of grapes come from the Syrah *cépage*. That is, to the degree in which the following parameters are scrupulously respected:

- Choice of terroir
- Balanced development of the vegetative mass
- Density of plantation
- Level of maturity
- Yield
- State of health [of the crop]

The wines obtained are then young, of a beautiful strong color, deep, ruby, with a very slight violet note.

The aromas are fresh, powerful on a fruity note (wild blueberry, blackcurrant) with a floral palette, violet, linden blossom.

The tannins are noble, without aggression, but present and round. The sensations in the mouth are balanced between acid and tannin with no dominance of alcohol. A fruity/violet note often adds licorice and smoke. ■

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PART III:

Pierce's disease

(The following questions were received from **PWV** *-readers in response to two reports on Pierce's disease in* **PWV**, *Part-I, March/April'93, Part-II, May/June'93)*

Q How long can a vine survive chronic symptoms of Pierce's disease before dying?

A: Climate and the vine's variety and age determine how long a vine with Pierce's disease (PD) can survive — or even more importantly — continue to produce a crop. Hot climates like the Central Valley in California accelerate PD symptoms due to moisture stress, even when there is more than adequate soil water.

Young vines (one to three-years-old) succumb more quickly to infection than older vines. The basis of resistance to PD appears to be related to how quickly the bacterium *Xylella fastidiosa* multiplies and spreads within the vine. One-year-old Pinot noir or Barbera vines can die the spring after infection, whereas chronically infected 10-year-old Chenin blanc or Ruby Cabernet can live for more than five years. Long before that, however, these chronically-infected vines will not have a crop.

Q When replacing a vineyard affected by Pierce's disease and changing the variety, is it better to pull out all the vines in the block and replant new vines or graft the healthy vines and pull only the diseased vines?

A: Consider more than Pierce's disease in your decision. Will you be using a different rootstock because of concerns about phylloxera?

Would you prefer to fumigate the block before replanting because of concerns that replants will be stunted by resident nematode populations?

If the answer to the above questions is 'yes' and the number of vines with PD in the block is high, you will want to replant the entire block.

If the foregoing are not major concerns, and only those vines near one edge of the block (typically next to a source of vectors) have a high incidence of PD, you probably would be better off replanting only that part of the block and individually replacing chronically diseased or missing vines elsewhere.

The first year that you confirm PD is present, it is a good idea to mark vines with symptoms and recheck them the following year. Remove all vines with PD symptoms the second year; they are chronically infected and unlikely to recover or continue to produce a significant crop.

By Alexander Purcell,
Dept. of Environmental Science, Policy & Management
University of California, Berkeley

Q Is there an economic threshold for the blue-green sharpshooter with regard to Pierce's disease?

A: There are various localities that have had numerous blue-green sharpshooters but never have had Pierce's disease. If you live in such a situation, consider yourself lucky and hope that nothing changes. If you have Pierce's disease in your own or nearby vineyards, the question is not so much "What is the economic threshold?", but rather "How can I best prevent or minimize sharpshooter populations within a few hundred feet of my vineyard?"

Q When removing blue-green sharp shooter habitat with herbicides or mechanically, is there a time of year that is preferable?

A: Unfortunately there is no **one** time of year that is best because the various kinds of plants that have to be removed require different techniques. Herbicides may be best for annuals, while repeated cutting (more than once/year and for more than one year) or uprooting may be necessary for perennials such as blackberry and wild grape.

Another problem is: What do you replace the removed plants with? The blue-green sharpshooter can reproduce on a very wide range of plants if year-round soil moisture and shade allow succulent growth. Presently, we do not have any recommended substitute plantings — ones that would prevent populations of sharpshooters from building up and that would not harbor the PD bacterium. More research is needed, and we are working to discover plants that are neutral or even antagonistic to the PD bacterium.

Q What do you think of a 'trap-crop' concept? Such as maintaining a green strip along the edge of a problem vineyard and treating this strip frequently with an insecticide? If this is possible, what would be some candidate plants?

A: Trap crops for control of blue-green sharpshooter would have to be permanent (lots of dollars and hours) to be highly attractive to the vector. Their effectiveness has never been tested. Trap crops would seem to invite trouble in those years when extended cool and wet springs reduce the effectiveness of insecticidal control.

The blue-green sharpshooter is more attracted to succulent growth than to particular species of plants. The lists of plants that are either preferred hosts of the sharpshooter or the bacterium *Xylella fastidiosa* is a long one. If you can, remove attractive plants like blackberry, elderberry, ivy, and so on, and replace them with grasses. This will reduce the available habitat where the blue-green sharpshooter lives.

If you choose to replace attractive plants with grasses, this alternative cover must be maintained in order to discourage growth of other plants that the blue-green sharpshooter prefers. This can be done by mowing and selective weed control. Insecticidal control of the vector can be used to supplement habitat management.

Q *You stated that "The effects of low winter temperatures on bacterial survival are probably indirect because bacterial cultures survive freezing very well in the lab." What is the mechanism of vine recovery for those vines that were infected later in the growing season?*

A: My best guess is that dryness, not cold, causes the PD bacterium to die in dormant vines during winter. The colder the winter, the drier the xylem seems to become in dormant grapevines. The earlier the vine is infected, the larger the number of bacteria present in the vine by autumn. More importantly, the bacteria have a longer time to spread throughout the vine. Both of these factors would favor the survival of the bacterium over the dormant period.

Q *What is the most effective early season Dimethoate application strategy, with regard to timing or stage of development, to control the over-wintering adults as well as the newly emerging next generation?*

A: The ideal time to treat vegetation alongside vineyards is as soon as warm weather causes increased foraging activity by the blue-green sharpshooter, but before bud break in grape vines. This is usually possible only when warm weather precedes bud break, so in practice, most applications will be made after bud break.

Remember that the blue-green sharpshooter has only one generation per year. Effective insecticidal control of adults entering vineyards will prevent eggs being laid during the spring. Treating during or just before cool weather is ineffective because the sharpshooters do not move around and feed sufficiently to be affected by the insecticide. Sticky trap monitoring is the key to determining the best time to treat and how effective treatments were.

Q *How long does Dimethoate persist systemically in plants at control level concentrations?*

A: In the lab, insecticidal activity against sharpshooters persists for about three to four weeks. In the field, persistence will depend on plant vigor, temperature, and rainfall. We don't have enough data to be precise. This is why monitoring for sharpshooter activity *after* treatment is important.

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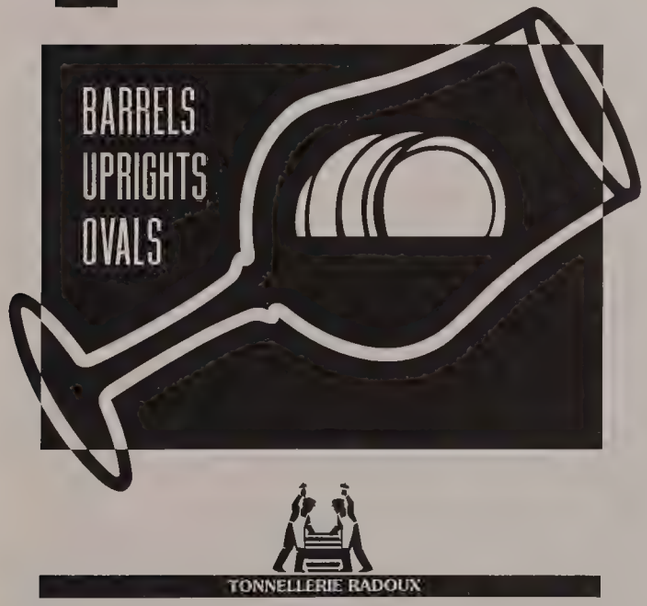

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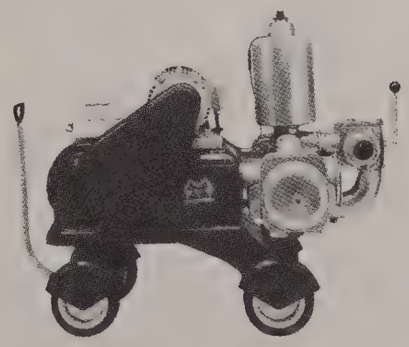

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Q Does mass-trapping of the sharp shooter vector have any potential for significant control? For example, are the newly available rolls of yellow sticky tape that are stapled along the vine row of any value?

A: My ***guess*** is that sticky tape would not trap enough blue-green sharpshooters to reduce their populations enough to see a corresponding drop in PD, but I'm not aware of any data on this point. For insect pests generally, trapping is effective if the trap is extremely attractive and the pest to be controlled can be tolerated in low numbers. I doubt that either is true for the blue-green sharpshooter.

However, sticky tape should be useful in locating where the greatest concentrations of blue-green sharpshooter enter a vineyard from surrounding vegetation. Simply stretch out the tape along natural vegetation adjacent to your vineyard and notice which portions of the tape capture the greatest numbers of sharpshooters. Note that grass-feeding sharpshooters in the Central Valley of California are **not** attracted to yellow traps.

Q Many growers are now planting a few prune trees along the edge of vineyards to provide habitat and overwintering prey for the Anagrus wasp that parasitizes the grape leafhopper. Do you think this practice would encourage or discourage the bluegreen sharpshooter?

A: It will not discourage it. Whether or not prunes support the blue-green sharpshooter will depend upon the condition in which they are grown. If the trees are located in drier areas away from habitats attractive to the blue-green sharpshooter, they should not be a factor for populations of that insect. Remember also that plums have been shown to be excellent hosts of the PD-bacterium, *Xylella fastidiosa.*

Prune trees should not be hosts of the grass-feeding sharpshooter vectors, but I have seen high populations of sharpshooters on the cover of grasses (chiefly Bermuda grass) that develop under repeated flood irrigation of plum orchards in California's Central Valley.

Q Are permanent cover crops likely to increase the incidence of PD in vineyards which are located in/near favorable habitats for the blue-green sharpshooter?

A: Not as long as these cover crops are mostly grasses from spring through summer in coastal vineyards. The blue-green sharpshooter can be found on wild mustard, chicory, and other common vineyard winter weeds, but these plants are typically disced in at or before budbreak. Mowing can also keep cover crops in a condition that is not attractive to the blue-green sharpshooter. Avoid permanent cover crops with Bermuda grass or water grass in areas where the grass-feeding sharpshooters (green sharpshooter or red-headed sharpshooter, for example) may be significant. ■

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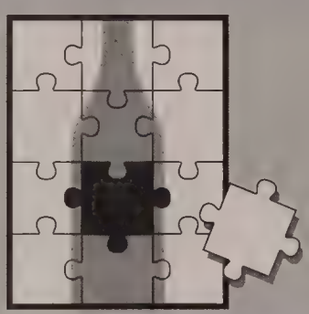

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SALICYLIC ACID:

Rootstock defense?

By C.J. Muller, R.K. Striegler, K.C. Fugelsang, and D.R. Wineman
Viticulture & Enology Research Center, California State University, Fresno

Is the salicylic acid content of rootstock indicative of resistance to phylloxera and other soil-borne pests?

Few events have been as catastrophic to the California winegrape industry as the recent emergence of biotype-B phylloxera. This strain of phylloxera damages and ultimately kills vines grafted on AxR-1 rootstock.[8,9]

It has been estimated that 60% of vineyards in Napa and Sonoma counties are planted on AxR-1.[23] All of these vineyards will eventually need to be replanted on rootstocks which have broad resistance to phylloxera (rootstocks of American species or hybrids of American species.) The cost of replacing vineyards damaged by phylloxera has been estimated at over $500 million.[6,16] As a result, grape growers and winemakers are extremely interested in rootstock resistance to phylloxera.

Hardie and Cirami have outlined mechanisms of resistance to phylloxera in a recent review of grapevine rootstocks.[10] They state that susceptibility should be measured as the fractional reduction in total growth, during a specified period of time, in the presence of a pest, disease, or debilitating condition. In general, they say phylloxera resistance may be due to:

1. Non-preference — The rootstock possesses characteristics that are unattractive for reproduction, feeding, or shelter to phylloxera or other soil-borne pests.

2. Antibiosis — The rootstock adversely affects the growth and reproduction of phylloxera.

3. Tolerance — The rootstock lives and thrives with no permanent damage, despite supporting phylloxera populations capable of damaging more susceptible varieties.

Most rootstocks demonstrating resistance to phylloxera that are currently in use are from three *Vitis* species; *V. berlandieri, V. riparia,* and *V. rupestris.*[22] Their phylloxera resistance is broad and durable, having remained intact after over 120 years of rootstock use in Europe. The proceeding information suggests that resistance is not due to a single mechanism, but that all three mechanisms of resistance are likely to be functioning at some level.

Studies by Dennis Boubals in France support the above reasoning.[2] He determined that resistance to phylloxera in various *Vitis* species was due to tolerance and repulsion. He viewed repulsion of phylloxera from roots as evidence for antibiosis.

We propose that salicylic acid and its metabolites may be the antibiosis factor involved in rootstock resistance to phylloxera and other soil-borne pests. Salicylic acid is ubiquitous in plants and its concentration has been found to increase when the plant is under attack by viruses, bacteria and fungi.[4,5,11,13,14,15] Salicylic acid is so common and seems to perform so many other functions in plants, in addition to defense, that it has been postulated as a plant hormone.[18]

In addition, salicylic acid and its metabolites seem to be cytotoxic (that is lethal) to microorganisms and have been shown to prevent viral replication in plants.[5,25]

Is it coincidental then, that non-vinifera varieties that display greater tolerance against pests have consistently higher levels of salicylic acid (and its metabolites 2,3- and 2,5- dihydroxybenzoic acids) than *Vitis vinifera*?[1,12,17,21,24]

If higher levels of salicylic acid and its metabolites result in antibiosis, then it stands to reason, that a quick method for determining phylloxera resistance might be to analyze root tissue for levels of salicylic acid. Analysis of salicylic acid content is done routinely in biological fluids, and there are accurate methods for identifying/quantifying it by chemical and physical means.[3,7,12,19,20,24]

Since the concentration of this chemical seems to increase when the plant is challenged, the root tissue examined must also be under attack by phylloxera for the test to be meaningful. Testing in this manner will not only determine base-line levels of salicylic acid, but also the roots' potential to generate such chemical under stress.

Surely, such testing should be carried out under conditions that imitate, as closely as possible those likely to be encountered in the field, in terms of other stress factors. This is particularly important regarding nitrogen availability. Nitrogen is needed by the plant for a myriad of crucial reactions, including manufacture of DNA as well as the enzymes which regulate the plants' metabolism. Included also, are the enzymes involved in the manufacture of the vines' defense chemicals, such as salicylic acid. In the plant, cell division and growth have first priority for nitrogen. Synthesis of the vines' defense mechanisms is of lesser priority in nitrogen utilization. Thus, if nitrogen is limiting, the vines' defenses will suffer.

We are not suggesting that growers rush to the drugstore and buy the world's supply of aspirin (a form of salicylic acid). Treatment of the roots with salicylic acid might not provide an answer to this problem. As indicated by Malamy and Klessig, first, such treatment might be too expensive, and second, since salicylic acid is quite soluble, it might not be feasible to achieve phylloxera-controlling concentrations in the immediate vicinity of the roots.[13] Rather, it is suggested that it is the salicylic acid within the plant (normally present, plus that produced as a result of attack by phylloxera), which might provide control.

We are currently investigating the possibility that significant differences exist in levels of salicylic acid among sensitive and phylloxera-resistant rootstocks. Also, we will be examining whether phylloxera-challenge will stimulate the vine to produce increased levels of salicylic acid. Data generated from these studies will increase our knowledge about rootstock phylloxera resistance. Also, this information might be helpful to the industry in selecting and breeding vines with resistance to phylloxera and other pests. ■

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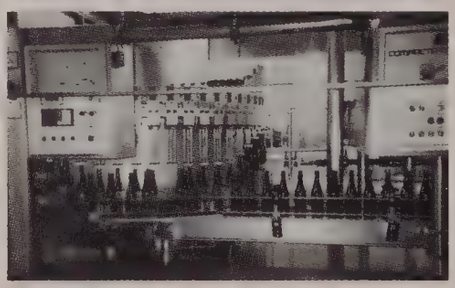

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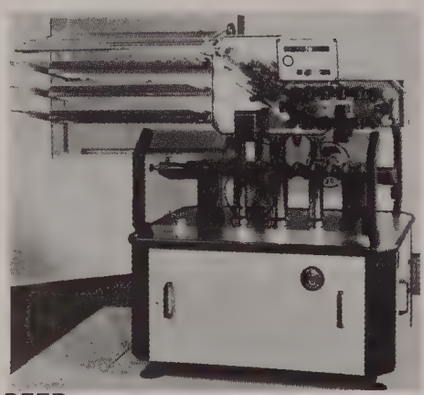

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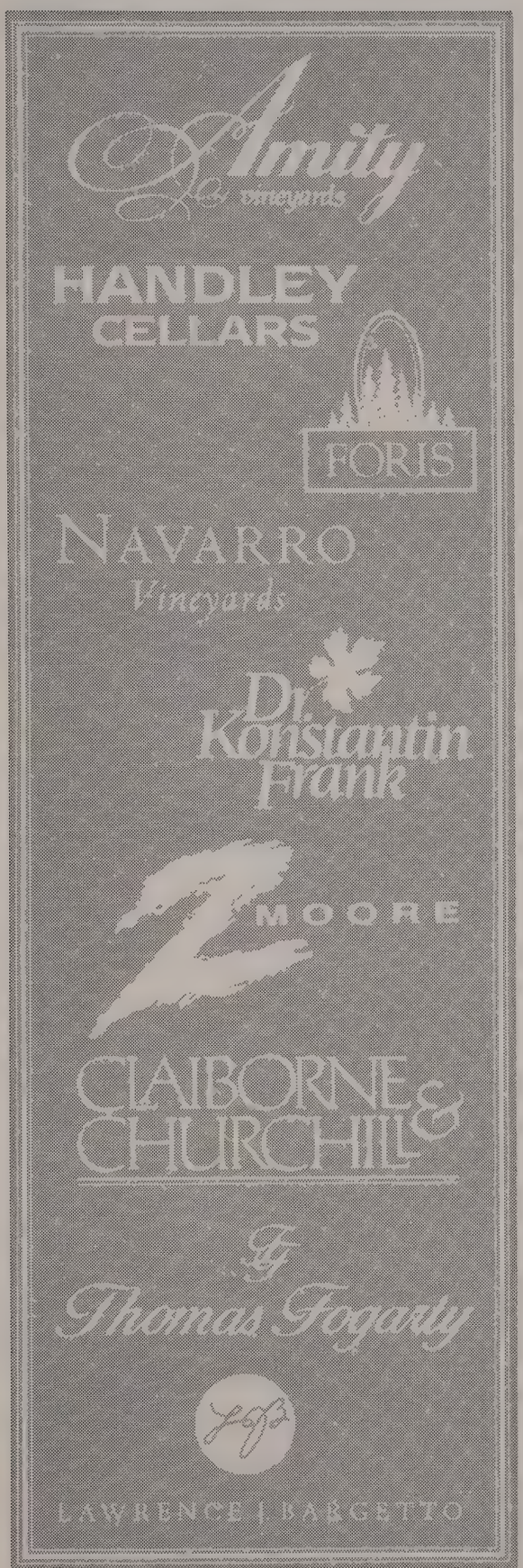
American Gewurztraminer

breaks the *Alsace-style* myth



By Eleanor & Ray Heald

"Climate is the most important factor in producing dry Gewurztraminer," Amity Vineyard's (Amity, OR) Myron Redford stresses. "Gewurztraminer is like Pinot Noir, it needs a cool climate."

This exclusive *PWV* varietal review examines elements necessary for production of a cool-climate, flavor-diverse American dry-style Gewurztraminer.

"Gewurztraminer and Pinot Noir are two varietals that seem to be more site-specific," notes Navarro Vineyard's (Philo, CA) Ted Bennett. "But an equally important consideration is hang time. "You are not going to make a great Gewurztraminer with abundant flavor if ripening occurs in August when the temperature is 104°F."

Physiological maturity

Bennett referenced studies he's read discussing Gewurztraminer's biological maturity and explained a new practice at Navarro.

"In 1992, we started picking at 19° Brix and worked our way up to overripe," he explains. "Lots were kept separate and 77% of the cuvee came from lots with Brix levels we considered physiologically mature in previous years. Lots under 23° Brix have different aromatics and add complexity.

"From this experience, we will continue to use multiple maturities to achieve the best wine blend. We currently find the wine attractive, but have no idea how it will age."

Dan Moore (Z Moore, Windsor, CA) describes harvest with the vineyard adjacent to his winery. "I pick for flavor and mouthfeel," he maintains. "In 1991, the hang time was significantly longer by 2½ weeks. The fruit was enjoyable at 21.5° to 22.5° Brix and we achieved many of the same results as in prior years when we picked at 23° Brix and higher."

Moore explains that this vineyard typically ripens in three different sections. When picking is done in the first block at slightly lower sugars, without optimal flavors, this lot offers the blend depth of mouthfeel and balances the acidity.

"In the last ten years, 1991 was the anomaly for me," Moore states. "I like the structure of the wine that came in at lower sugars."

In the Finger Lakes region of New York state, Vinifera Wine Cellars/Dr. Konstantin Frank (Hammondsport, NY) grapes are picked between 21° and 22° Brix. Winemaker Peter Bell looks for fully ripe grapes and welcomes a small amount of dry botrytis.

At Claiborne and Churchill (San Luis Obispo, CA), all grapes are purchased. "Most of the Gewurztraminer comes from Ventana Vineyard (Monterey County)," Clay Thompson reports. "At Ventana, Doug Meader picks over a period of time, but we usually get juice averaging 21.5° Brix. But we, like everyone else, noticed that in 1991, the fruit had much more character even if the fruit was picked at the same sugars as prior years. We got our juice October 5 in 1991 and that's a full month later than usual."

Michael Martella (Thomas Fogarty Winery, Portola Valley, CA) also sources grapes from Ventana and agreed with Thompson's remarks, but stated that grapes were picked at 22° to 24° Brix for Fogarty.

"We've picked both ways, some by accident and some by design," Milla

Handley (Handley Cellars, Philo, CA) offers. "In 1992, circumstances led to Gewurztraminer arriving at the winery at 24° Brix and I like the wine. Yes, we had high alcohol problems, but it's very flavorful.

"If I had my druthers, I'd pick at 22° to 22.5° Brix with all dark pink berries, but you have to go with flavor. It's a consideration above alcohol, above acid, and above everything else, it must taste right.

"I favor the idea of picking vineyards from slightly less ripe to overripe. The last vineyard we pick is our least ripe (21.5° Brix), but bunches hang on the vine at least a week longer than other sources and it is fully colored."

At Bargetto Winery (Soquel, CA), grapes are picked at one maturity. "We don't have the option to select," Paul Wofford explains. "We've gone from picking in the 19° - 21° Brix range, where we captured floral qualities, but it wasn't what we were looking for overall in a barrel-fermented style. Currently, grapes are picked right around 23° Brix in the Pinnacles Vineyard (Monterey County) with 80% to 90% of the berries fully pink and do overnight skin contact to extract flavor intensity and heighten the aromatics.

At Foris Vineyards (Cave Junction, OR), grapes are picked in a 22.5° - 25° Brix range with pH levels 3.3 to 3.7. "Botrytis is rarely a problem, in fact I'd like to see more of it," Sarah Powell comments.

"We pick by flavor and taste, instead of Brix," Redford explains. "I taste the grapes after they have all turned dark purple. When the spice appears, we pick."

Skin contact

Sarah Powell also believes that a 24 to 48-hour skin contact is a means to achieving flavor complexity.

"Skin contact is very relevant with Gewurztraminer grown in a cool climate," adds Bell. "It's the only varietal on which I use this technique. Average duration is 18 hours at 50°F. As we press, I taste the juice and when it starts getting too coarse, I start a press fraction that ends up in a bulk wine."

Redford also advocates use of skin contact as a complexity enhancer. He usually gives 12 hours of skin contact to some of his lots. The temperature is determined by the weather; usually 50°F to 60°F overnight.

Alcohol levels

Discussion of picking at maturity levels with 24° Brix triggered more discussion of sugar conversion. "It depends on whether your focus is flavor or alcohol," Martella maintains.

"Alcohol levels and the sugars we pick at vary widely," Bennett contends. "In 1991, we had an early hot spell, then it cooled down. The lots we liked best averaged 24.5° Brix. True, the wine is slightly hot, but it is flavorful.

"Just like Chardonnay, with Gewurztraminer you are better off picking when the grapes taste physiologically ripe than picking them underripe. The element that's new to me is picking when berries are green and lacking pink color."

Jim Klein (Navarro Vineyards) suggested the topic of aromatics again as an overriding decision. "We're getting a greater aromatic profile by picking at a range of sugars," he stresses. "Less ripe fruit gives us a 15% to 20% blending component for elevated floral qualities. The mouthfeel, structure, and flavors are coming from the more mature fruit. It elevates the alcohol, but we're concerned with flavor at this point."

Moore states that over the last few years he has experienced huge sugar to alcohol conversions. "I've been wondering if they created a monster yeast," he comments. There was general agreement on this point.

"Vinquiry has said that conversions of 0.61 are possible," Handley states. "We're seeing at least that. We've tried natural yeast with the thought that this would lower our conversion, but it didn't work with Gewurztraminer. However, natural yeast lots went dry when commercial yeast lots didn't. So who knows?"

Bennett notes that in 1991 he used M-2 yeast because it was touted as a lower alcohol converter. There was only 0.2 difference in alcohol levels, 13.7% vs 13.9%.

Alsace-style myth

"With respect to Gewurztraminer, Alsace producers go for alcohol," Bennett contends. "Their bottlings will have a pH of 4 if you measure it. In general, they go for as big a wine as they can get. They aren't afraid of low acids.

"One of the biggest misconceptions about Alsace Gewurztraminer is that it's dry. They are rich wines with residual sugars in the range of what we'd call semi-dry. They don't worry about the sugar because their focus is richness.

"California is producing the driest Gewurztraminer in the world. Whether dry is good is a whole other issue."

Claiborne & Churchill use the term 'Alsatian Style' on their Dry Gewurztraminer. Thompson defends this decision by saying, "Originally, it was supposed to be a code word for dry. Back in 1983 when we started, there were not that many dry Gewurztraminers. Consumers thought all Gewurztraminer was sweet. We were simply trying to convince people to try our wine, but our inspiration and love of this wine stems from Alsace.

"We use a significant portion of wood (older wood) and the same laissez-faire attitude about ML as the Alsace producers. When we changed the label from Gewurztraminer to Dry Gewurztraminer we almost dropped the Alsatian Style reference."

"Although Alsatian Gewurztraminer should be regarded as the benchmark," offers Peter Bell, "there are certain pitfalls to attempting emulation of that style," he says.

"An American Gewurztraminer made the same way (with alcohol out of balance, low acid, and phenolic bitterness) might well be a commercial flop," adds Bell. "Therefore my approach is to make the wine in a more Germanic style — slightly higher acid, alcohol in the normal range, some RS (0.8%), and a soft finish, but still having varietal character."

Redford believes that his Gewurztraminer (first produced in 1977) "continues the tradition of Alsace in America."

Acidulation and pH

"Wines are better when they are not acidulated," Bennett remarks. But Thompson points to a paradox and dilemma with Gewurztraminer. "The flavors I'm looking for don't really start coming out until the acid starts to drop," he says. "The pH rises and I almost always have to add tartaric acid upfront and sometimes adjust again later because I want a pungent quality."

Handley acidulates in most years and she tries to make her best guess at crush. "Our pHs drop rapidly," she comments. "We get acids of 0.60 to 0.65g/100mL with pH of 3.1, so we're careful not to over-acidulate. We don't know why our pH is so low. At harvest, pH is 3.4 to 3.5 and by the time the tartaric settles out, we have a bottling pH of 3.1."

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Moore has had the same experience. "With the smallest amount of tartaric acidulation in some lots of Gewurztraminer, the pH drops dramatically," he notes. "This has driven me off the acidulation course. In making an analogy to Chardonnay, there's a shift in perceived style at the high-end of the variety. There are a significant number of these wines with pH of 3.6 and acidities of 0.50 to 0.55 with flabbier mouthfeels.

"Because I want a richer mouthfeel in Gewurztraminer, I've backed off from acidulation. I'm acidulating only in extreme instances and our pH levels have climbed to 3.6 to 3.7 in the bottle. Five or six years ago that would have bothered me, but I don't even think twice about it anymore."

"My region necessitates that I pick by flavor and berry appearance with full, even, rose coloration," Bell maintains. "Acid levels and pH are not as important to me because they can always be adjusted."

Klein explains his acidulation method as follows. He titrates tartaric acid against the juice to determine the number of pounds/1,000gal of acid he needs to add to arrive at a pH of 3.4. "If the juice pH is already at 3.4, then I don't acidulate," he says. "I don't base decisions on TA at all. To me, pH is the critical factor because the aromatics and flavors change dramatically with pH."

Fermentation temperatures

"Different fermentation temperatures bring different aromas and flavors," Redford contends. "Cold fermentations result in fruitier wines while warmer temperatures enhance spicy characters."

Handley queries, "What's cold? To me that's under 50°F. So, I'd say that I don't ferment cold at 60°F to 65°F in a tank. Barrel fermentation does not have temperature control and I barrel- and puncheon-ferment anywhere from 25% to 40% depending on the year."

Powell splits lots to ferment some tanks warm (60°F) and others cold (45°F). In 1991, she put wine into two barrels as an experiment and liked the results. "Ageing wine in neutral old puncheons is an asset to our wine," she comments. "The percentage needs to vary with the vintage and vineyard. In 1992, 50% of the wine was aged for three months in five-year-old puncheons.

At Bargetto, two different Gewurztraminers are produced. The medium-dry is tank-fermented in the low 50°F range. The dry Gewurztraminer is 100% barrel-fermented, going into the barrel at about 40°F. The wine is inoculated in tank and at the first sign of fermentation activity, the juice is transferred to barrel.

"By the time fermentation gets rolling, maximum temperatures are in the mid to high 60s in the barrel," Wofford explains. "It rarely gets above 70°F. I'd be concerned if it got into the high 70s where Chardonnay can go without consequence.

"We use Steinberg yeast for both Gewurztraminer styles, but notice a dramatic difference in character depending on fermentation temperatures. The cold-fermented medium-dry style has significantly greater floral character while the barrel-fermented dry wine showcases spicy elements. Deep, rich flavors come with barrel fermentation."

At Thomas Fogarty Winery, juice is tank fermented at 50°F and can take up to 50 days. "When it gets down to 5° Brix, I let the wine warm up to 55°F - 60°F," Martella explains.

Martella stops every tank at 0.4% residual sugar and Handley at 0.6° Brix, while barrels and puncheons go to dryness. Thompson does ⅔ barrel fermentation and ⅓ tank fermentation. Barrel-fermented lots go into barrel at 50°F and peak in the 70s. Tank portions are kept at 50° - 55°F.

Navarro operates under several different regimes. Fermentation is done in many ovals and puncheons in which maximum fermentation temperatures reach 59°F to 63°F. Tank fermented lots reach a maximum of 55°F. One tank-fermented sweet reserve lot of 1,600 gal is stopped at 2.5% RS and used as a blending component to bring the sweetness level of the blend to 0.4%.

"When you ferment cold, you'll get significantly more aromatics in the beginning, particularly the Muscat character of Gewurztraminer," Bennett emphasizes. "As the wine ages, those aromatics that you gain from low-temperature fermentation do not hold up in the bottle. Since we don't release our wine until it's been in the bottle at least six months, cold fermentation offers us little advantage."

Moore cold settles at 50°F to 55°F before the wine is transferred to puncheons. "At first, we used Epernay, but we've gone to about 70% Montrachet," Moore states. "It offers us a slow, even 25 to 40-day fermentation ideally hitting about a 65°F maximum temperature. In warm years, however, we might get as high as 75°F. Cellars are on night air, so much depends on Mother Nature."

All of the Gewurztraminer is tank-fernmented at Vinifera Wine Cellars.

Yeast strains

Moore's last remarks quickly got a foray going in the direction of yeasts and decidedly away from a Prise de Mousse (PDM) camp. As stated earlier, Wofford at Bargetto uses Steinberg and Moore's preference is Montrachet, which is also the choice for Martella at Fogarty.

For a library selection submitted to the tasting, Redford at Amity had used champagne yeast, and has been using Steinberg, but switched to VL-1 in 1993 for its turpene-enhancing qualities. Thompson (Claiborne & Churchill) prefers Epernay as do Powell at Foris, Handley, and Bell at Vinifera Wine Cellars. However, half the lots at Claiborne & Churchill are fermented with natural yeast. Navarro uses a mixture of PDM and Epernay. "I use Epernay on those lots I intend to stick," Klein contends.

MLF — pros and cons

"We've elected not to do MLF," Wofford says. "I specifically try to avoid it in the style we're shooting for. The pH of our Monterey County fruit source is already elevated. I'm not looking for added richness or to soften acids. In fact, I believe we lose an inherent lightness in the fruit character by going to MLF."

Finding no MLF proponent, the following incident was related by Klein. By accident in 1992, a French enology intern inoculated one of Navarro's tanks with MCW malolactic bacteria. "This wine had a beautiful, buttery character during fermentation," says Klein. "At about 12° Brix, we put it into puncheons and aged it on the lees. With no acidulation, the pH on this wine was 3.44. By blending it with other wines, we made a premier reserve wine with lots of character."

"We're not saying, 'no, never' to MLF, but it's not suited to the style of the volume of our Gewurztraminer production," Bennett adds.

Lees contact

Wofford who barrel-ferments, allows the wine to stay on the lees 30 days (without stirring) past dryness to add creaminess.

"When you talk about lees, I think you have to consider the year," Handley re-

marks. "We leave the wine on the lees as long as possible before bottling in late January or February. But the total time varies depending on whether we pick in September or October. We use an outside bottling line and we schedule with them in August. This doesn't give us options."

Thompson comments that his situation is similar to Handley's. "A lot depends on economics," he states candidly.

Moore typically bottles Gewurztraminer in mid-July and the wine receives eight to 11 months lees contact without stirring, again depending on the vintage. "I try to get the barrel-fermented wine into tank for at least 45 days so I only have to do one pass through a filter before bottling," Moore adds.

During the 90-day fermentation at Foris, gross lees remain unstirred.

"It would be of interest to do MLF and eliminate filtering," Thompson suggests. "This might offer a more flavorful, longer ageing wine. Since we don't do MLF, I filter and sterile filter."

For the Navarro 1992 release, both a filtered and unfiltered bottling of the identical cuvee were offered. The wine has a RS of 0.45% with bottling SO_2 levels at 25ppm free and 65ppm total. "There's simply insufficient sugar and high enough alcohol (13.3%) in the wine to support refermentation by any yeast strain," Klein comments.

Appropriate descriptors

"To use a descriptor, you have to assume that your audience knows what it is," Martella contends. Martella and Bennett both questioned the percentage of wine consumers who really know what lychee is.

"There's a host of citrus elements in Gewurztraminer," Bennett remarks. "People know what citrus is, so this relationship is valid. They understand the differences between lemon, orange, lime, and grapefruit juice. They know the difference between the aromas and flavors of the flesh and the zest. They most likely know the difference between a juice orange and mandarin orange. These are legitimate descriptors."

Rose petal was also considered a bonified descriptor.

"I try to best express the aromas and flavors given by the grape," Powell maintains. "I think these are rose, grapefruit, orange peel, clove, ginger, and I do use lychee."

"As an industry, we need to keep our descriptors live and in person, not in a can," while actually tasting canned lychee fruit, Moore concludes. ■

PWV *thanks Z Moore Winery for hosting the tasting/discussion and the following winery representatives for participating: Paul Wofford, Bargetto Winery; Clay Thompson and Fredericka Churchill, Claiborne & Churchill; Michael Martella, Thomas Fogarty Winery; Milla Handley, Handley Cellars; Ted Bennett and Jim Klein, Navarro Vineyards; and Daniel Moore, Z Moore.*

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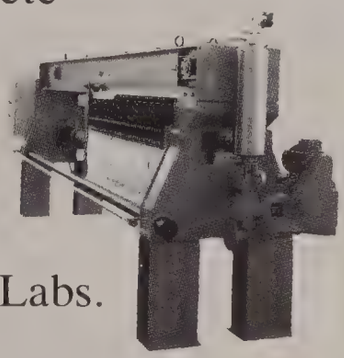

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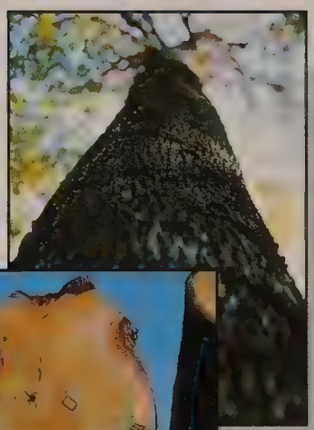

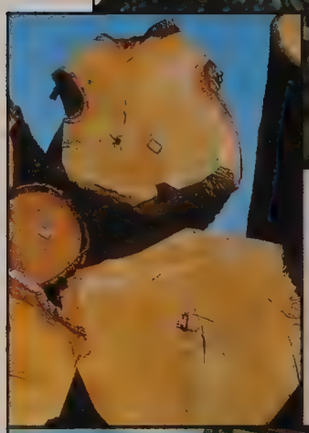

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Imaginative foods for Gewurztraminer

By Eleanor & Ray Heald

Let's use some imagination in creating wine and food harmonies for Gewurztraminer. Aren't you just a little bored with the Asian connection? Gewurztraminer is a good match with the subtle, yet exotic, flavors and textures of oriental foods, such as Chinese, Vietnamese, and Japanese, but these are not the only possibilities.

Appetizers and first courses

Foie-gras and Gewurztraminer is a classic combination. In Alsace, Foie-gras en Brioche is served in many restaurants. The pastry adds a unique dimension not achieved by foie-gras alone.

According to Alsace tradition, aperitif Gewurztraminer pours are served with soft pretzels, salted biscuits flavored with cheese or caraway seeds or a few slices of Kougelhopf, the uniquely shaped raisin and almond bread. The play of both salty and sweet foods with Gewurztraminer adds interesting elements.

Gewurztraminer is the most full-bodied wine of Alsace. Its complex, yet delicate, aromas harmonize naturally with richer seafoods such as trout and salmon — baked, broiled, but especially smoked.

Finger sandwiches with easily prepared smoked salmon mousse are delicious with Gewurztraminer and make an attractive plate of hors d'oeuvres. A spicy, pumpkin soup is a welcome accompaniment.

Joseph Matter, chef/owner of the Michelin one-star Hotel des Vosges restaurant in Ribeauvillé, France, prepared some splendid matches to illustrate the versatility of Gewurztraminer. "A Coquilles St. Jacques Mousse with peppercorns works well because the peppercorns play against the spiciness of Gewurztraminer," Matter suggests.

The richness of a Foie-gras d'Oie with Fig Puree was complemented by the palate breadth of Gewurztraminer. "The fig puree delivers a delicate sweetness allowing full expression of the wine," Matter contends. "Additionally, the fruitiness of the figs tends to lighten the foie-gras. Foie-gras can come across too rich, but a fruit puree balances the perceived richness. The fig cuts the fat of the liver and allows the wine to succeed. The fig seeds in the puree add a crunchy character distracting from the fatty richness."

Main courses

Matching the rounder flavors of roasts

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and game such as wild boar stew, venison saddle roast, rabbit, or pheasant with Gewurztraminer is chancy. What do work handsomely are veal kidneys and sweetbreads. The more opulent Pinot Gris from Alsace works best with heartier beef, lamb, and game.

Those prefering meatless preparations will delight in a vegetable gratin made with Gruyere or Parmesan served with a glass of dry-style Gewurztraminer.

Chef Matter prepared Raviole de Grenouilles (Frogs Legs Ravioli) in chicken cream sauce. The dish provided a neutral canvas on which the wine could display its personality. "The resistance of the frogs legs and the pasta force you to chew on both the food and the wine," Matter illustrates. The Gewurztraminer refreshed what might have been perceived as a heavy cream sauce. Aromas from a fresh dill sprig on the plate elevated the wine's inherent spicy aromas.

Posing a significant contrast to the wine was Matter's preparation of Sandre (pike) Roti with Girolles and Tomato Coulis which require a dry Gewurztraminer. The fish is sufficiently neutral to emphasize the balance between the wine's naturally low acidity and heightened fruitiness. The earthy, girolles (mushrooms) were mellowed by the wine's spicy, fruity elements. The coulis was light and creamy with chunks of fresh tomato.

"It's interesting to see how the acidity of the tomato coulis refreshes against the wine's low acidity to cleanse the palate," Matter notes. "In general, I'd have to say Gewurztraminer likes rich, fatty, low acid foods. It dislikes acidity in food because acidity emphasizes the wine's sweetness and can make it appear cloying and flat on the palate. If you prepare something with acidity like the tomato coulis, the Gewurztraminer must be one of the driest."

Cheeses

Gewurztraminer is great with mature and stronger-flavored cheeses such as imported Munster (not the insipid, rubbery cheese with the orange-colored rind found domestically). Pont L'Eveque, readily available where specialty imported cheeses are sold, makes a good substitute for imported Munster.

Blue-veined cheeses destroy the flavors of many wines. Surprisingly, Gewurztraminer is particularly delicious with Bleu d'Auvergne and Roquefort.

Classic desserts

It's frequently difficult to pair a dessert wine with a dessert. If the dessert is sweeter than the wine, the wine tastes flat. If the reverse is the situation, the dessert (and lots of preparation time) is lost. A Gewurztraminer (between 0.5% and 1.0% RS) is perfect complementing a simple cheese cake, lightly flavored with cinnamon and vanilla. Both wine and food benefit from this match.

When purple plums are in season, a plum pie and Gewurztraminer with 1% RS do nicely as a dessert combo if about ¼ teaspoon of cinnamon to play on the natural spiciness of the wine is used. ■

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This program offers freely programmable pressure phases. This means that the parameters for the desired pressure, the pressure holding time, and the number of rotations can be defined from zero to the maximum values.

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This program offers complete flexibility for the winemaker to process all grape varieties — whole cluster, destemmed and crushed. This procedure is done in the softest possible way and the highest demands for quality with regard to nearly solids-free juice.

Up to eight separate programs can be stored. The stored programs can be modified during operation for specific one-time requirements or permanently changed, all without interruption of the operating cycle.

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Velo SpA offers a full range of horizontal pressure-leaf filters to compliment its traditional line of vertical leaf filters. Horizontal filters are available in eight sizes with the largest unit, 20 square meters. Vertical filters are available in eight sizes with the largest unit, 50 square meters. All filters (five square meters or larger) include dry cake discharge. Over 400 Velo pressure-leaf filters are installed in North America.

Velo also provides other filter types, including plate filters in 'German sanitary' style construction (sizes 40x40 and 60x60), lees filters, and rotary drum vacuum filters.

For more information, contact: **Scott Laboratories, Inc.**, 2220 Pine View Way, Petaluma, CA 94955, tel: 707/756-6666, fax: 707/765-6674.

Please see our ads, pages 15, 23.

McBrady Engineering, Inc.

The new McBrady Model #40 ORBIT bottle rinser/gas injector is designed and priced for smaller wineries. The Model #40 performs all of the functions of a larger, more expensive bottle cleaner at a fraction of the cost. The simplistic design uses one set of change parts with adapter to run 750mL, 500mL, or 375mL bottles, direct-tube injection for thorough cleaning and gas injection, and a simple installation on an existing line while occupying only 20 inches of line space. The Model #40 operates at lines speeds of 40+ bpm.

Other ORBIT bottle cleaner/gas injector models include:

Model #60 — 48-inch diameter operates at speeds of 60 to 70 bpm. This is the most popular model with over 60 machines installed.

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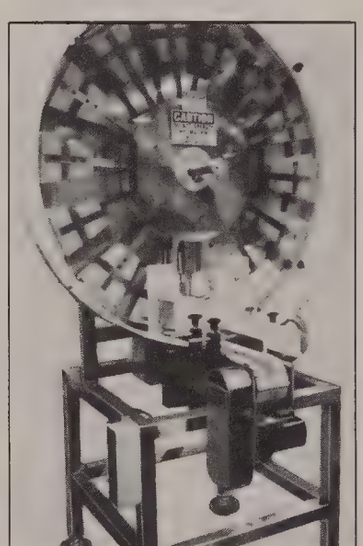

For more information, contact: **McBrady Engineering, Inc.**, PO Box 2549, Joliet, IL 60436, tel: 815/744-8900, fax: 815/744-8901.

Please see our ad, page 51.

Santa Rosa Stainless Steel

Santa Rosa Stainless Steel (SRSS) has built and installed over 10,000 tanks in over 500 wineries across the U.S. in the last 25 years.

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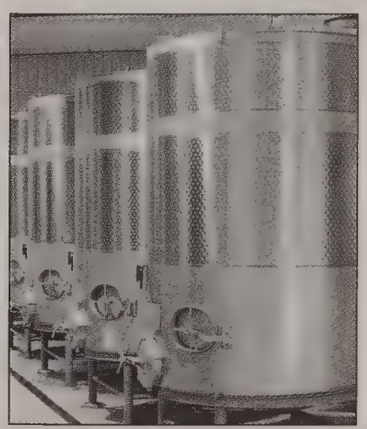

SRSS has designed, fabricated and installed a 50-bbl brewhouse and fermenting cellar, including a steam-fired kettle, mashtun, and lautering system.

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For further information, contact: Rod Ferronato, **SRSS**, at tel: 707/544-777.

Please see our ad, page 33.

Enotech Corporation

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suited for tin and poly-laminate capsules; capsule applicators; and heat-shrinking equipment; for all desired bottling line speeds. Spinners and heat-shrinkers can be combined with capsule applicators into monobloc units.

A new development is a universal capsuling machine combining spinning heads (for tin and polylam) and thermal heads (for heat-shrink capsules). Heads need not be removed/reinstalled when changing from one capsule type to another. This universal machine is also available with integral capsule applicator.

For more information, contact: **ENOTECH**, PO Box 576, Palo Alto, CA 94302, tel: 415/851-2040, fax: 415/851-2034.
Please see our ad, page 2.

RLS Equipment Co.

The AMOS Adjustable Drive System (ADS) stemmer/crusher has many features to provide performance tailored to individual requirements.

The ADS has independent variable-speed motors on both the basket and internal stainless steel spike stripping-shaft. The gap between the crushing rollers is adjustable from 3 to 100mm, to allow the option of destemming and/or crushing. Models range from 10 to 120 tons/hour capacity.

The unique rectangular openings in the Hostalen (a highly durable plastic polymer) destemming basket permit grapes to pass through with minimal maceration. The newly designed 'California'-style basket (see photo) allows for even higher whole berry counts, with a nominal amount of stems.

AMOS and Kiesel progressive cavity pumps are available in 5- to 100-tph capacity. All models are equipped with reversal protection switches, dry-run protection, and are ideal for transferring must, fermented must, and whole clusters.

For filtration needs, RLS offers Strassburger equipment. Conventional filtration systems include pad filters in various chassis sizes, and DE and lees filters. The Micro-Cross cross-flow filtration system provides sterile filtration in one pass with no color stripping.

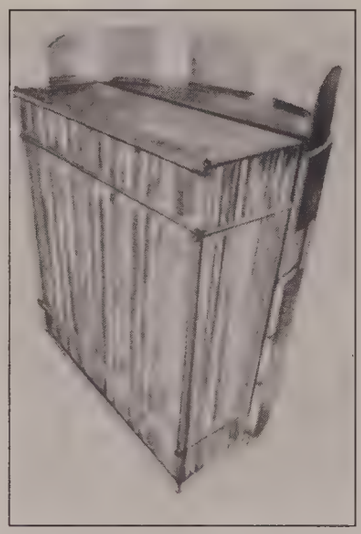
For pressing, RLS offers the Willmes line of equipment. Both the Tank Press and Universal Press, providing high yields and low solids in the juice, are available with a variety of options, including PC controllers with champagne or still wine programs. The newest Willmes WCP press addition is designed specifically for use in the small to mid-sized winery.

The most recent RLS-addition is the PERA/COQ membrane-style press available in 3,700L to 24,000L capacity. Highly regarded in France, the PERA/COQ press is available with a variety of options, including PC controllers, axial-feed, and double doors.

For more information, contact: **RLS Equipment Co.**, 609/965-0074 or 800/527-0197 on the West Coast.
Please see our ad, page 45.

StaVin Incorporated

StaVin produces modular systems for introduction of air-dried, fire-toasted French, European, or American oak to wine. StaVin modular systems and stainless steel barrels with inserts provide dial-in



versatility in adjusting wood-to-wine ratios, offering winemakers precise tools to impart the best flavors of oak cooperage to their wines.

For example, a modular system in a 6,000-gal tank can equal the flavor accrual ability of 100 French barrels — at a fraction of the cost.

The StaVin system in stainless steel barrels may be used as a concentrator for component blending. Low maintenance StaVin barrels are long-lasting, and provide strict oxidation control and minimum ullage. The barrels are designed for standard pallet handling systems.

StaVin wood is carefully selected, harvested, cut and stacked for drying. StaVin drying is not by harsh kiln heat application. A minimum of 24 months traditional air-drying draws out the oak aromas and softens tannins until it is ready for the flame. Fire toasting puts an edge on the flavors, enhancing the oak further.

StaVin's system allows insertion of 22 sq.ft. oak packages to rejuvenate 'tired' oak barrels, adding years of useful service to existing cooperage. Vac-uum-packed units seal in freshly toasted flavors until moments before they meet the wine. StaVin oak is prepared to meet all commercial winemaking applications.

For more information, contact: **StaVin**, PO Box 1693, Sausalito, CA 94966, tel: 415/331-7849, fax: 415/331-0516.
Please see our ad, page 53.

Carlsen & Associates

Carlsen & Associates is a design and manufacturing company specializing in process equipment for the wine industry with a primary product line of pumps and pump systems. We are actively engaged in designing new systems and upgrading existing systems to aid in producing higher quality wines and improving production.

The newest development is a system utilizing a Waukesha positive displacement-style pump to move whole clusters of white grapes directly to the press.

The system includes a receiving hopper with a screw conveyor that conveys the grapes into a pump hopper, also with a screw conveyor that is directly coupled to the inlet port of the Waukesha pump. Both screw conveyors are variable speed and are adjusted to convey the same amount of grapes to the pump (which is also variable speed) that are being discharged, thus reducing maceration caused by an excessive buildup of grapes in the hoppers. In addition, the unique rotor shape of the Waukesha pump cuts rather than crushes any stems that are partially in the pump inlet when the rotor closes the port.

During white grape receiving, this system eliminates the need for a stemmer/crusher, greatly increases press capacity, and decreases filling time compared to dumping whole clusters directly into the press. The stems are introduced as a press medium allowing greater yields at lower press pressures.

The same system is also used for red grape production by simply installing a stemmer/crusher between the receiving hopper and the pump hopper.

For more information, contact: **Carlsen & Associates**, 5228 Aero Drive, Santa Rosa, CA 95403, tel: 707/576-0632, fax: 707/576-7698.

Please see our ad, page 50.

Process Engineers, Inc.

Process Engineers is the west coast representative for many equipment manufacturers. The newest of which is Gasquet, manufacturer of the Gasquet/Bordeaux barrel washer and a complete line of filtering equipment, and a new line of stainless steel butterfly and ball valves, that set the standard for quality valves at the most reasonable prices in the industry.

We also carry the complete line of well-known Demoisy equipment with everything from stemmer/crushers to grape conveyors and receiving hoppers.

In addition, we are the west coast representative for the Europress. This was the press on the cover of the Nov/Dec'92-***PWV***. Ideal for whole-cluster pressing, due to the unrestricted full capacity drum, infinitely variable program for gentle pressing, and the largest door opening on the market. The press comes with a four-inch axial infeed and ball valve as standard equipment.

With many options available such as five- or six-inch axial inlet, pressure sensor and pneumatic pinch valve, pomace augers, and a Champagne program controller, it's easy to see that the Europress is designed to fit any need. The Europress is available in sizes from 1,800L to 25,000L.

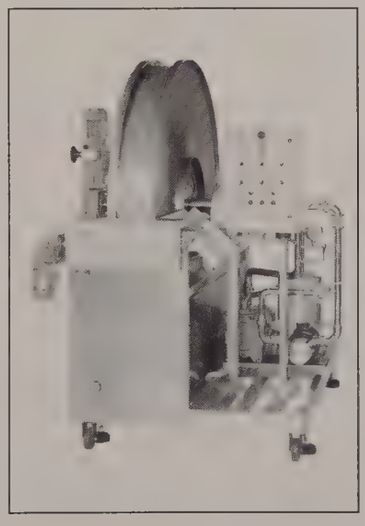
For further information, contact: **Process Engineers Inc.**, 26569 Corporate Ave., Hayward, CA 94545, tel: 510/782-5122, fax: 510/785-8187.

Criveller Company

Criveller Company, in collaboration with a large European manufacturer, is proud to present to the North American market the ultimate design in red-grape fermentation: the **rotofermenter**. This unit, which is entirely built in stainless steel, is available in different capacities: from the Model 80 Hl (2,100 US-gal) up to the Model 600 Hl (15,900 US-gal).

Rotofermenters offer the advantage of controlling the fermentation temperature, extracting more color, operating as a dejuicing tank, and facilitate handling of the fermented dregs prior to the pressing stages. Several of these rotofermenters were installed for the 1993 vintage with very successful results.

Rotofermenters may also be used to cryomacerate aromatic varietals such as Gewurztraminer in order to achieve a deeper flavor extraction.



Vacuum filters

In the last three vintages, Criveller Company has installed several vacuum filters throughout North America. This unit is available in various sizes to satisfy the requirements of small, medium, and large producers. The versatility and simplicity of the unit made its utilization on the following filtration applications possible:

- Freshly pressed grape juice.
- Heavy tank bottoms resulted from juice clarification.
- Fermented or unfermented lees.
- Apple juices and apple juice sediments.
- Enzyme-treated fruit juice and others.
- Vinegar lees.

Advantages of the utilization of a rotary vacuum filter are:

- Recovery of a high percentage of good juice from filtration of tank bottoms clarification residuals.
- Recovery of high percentage of wine or juice from filtration of lees.
- Reduction in labor if compared with conventional lees plate filters.
- Cost definitely lower than centrifuges.

For more information and references in Canada and the U.S., please call: **Criveller Company** at 905/357-2930, fax: 905/374-2930.

Please see our ad, page 44.

KLR Machines, Inc.

Vaslin and Bucher grape processing equipment are provided by KLR Machines, Inc., including the Delta destemmer and crusher, PM progressive cavity must pumps, Vinimatic rotary fermentors and drainers, and a wide range of presses.

The Vaslin line includes the smaller PHP and larger CEP horizontal basket presses for red wines. The Bucher line includes the smaller (1,800 - 5,000 liter) Bucher RPS and RPF presses, and the larger (8,000 - 32,000 liter) Bucher RPZ and RPA presses.

The new Bucher RPF press includes new programming functions, and will replace the Bucher RPS line of small presses. The new Bucher RPA press extends these new capabilities to the larger press sizes.

KLR also provides Begerow and Romicon filtration media and equipment, including BECO filter sheets, Becofloc filter aid, and BECO plate and frame filters. Crossflow filtration equipment from Romicon include both the Romicon WF wine filter and new Romicon LF lees filter.

Other supplies and equipment from KLR include Sanoplast heat-shrink capsules, and Unipektin dealcoholizers, desulphurizers, evaporators, essence recovery units, and specialty heat exchange equipment.

KLR celebrates its **10-year** anniversary in 1994, and maintains sales and service offices in **Sebastopol, CA** tel: 707/823-2883, fax: 707/823-6954) and **Bath, NY** (47 W.Steuben St., Bath, NY 14810, tel: 607/776-4193, fax: 607/776-9044).

Please see our ad page 6.

The Compleat Winemaker

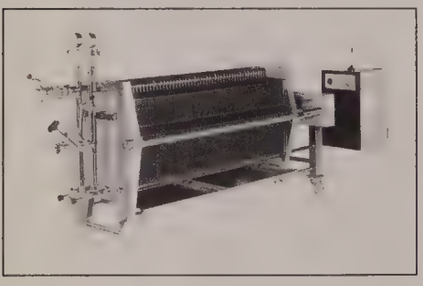
The Compleat Winemaker (TCW) supplies various processing equipment to the wine industry. New is the TCW TEMPCON microprocessor temperature controller for wine tanks. Featuring constant digital readout, programmable to set high and low points — the temperature sensor can be adapted to existing thermowells and can be set to Fahrenheit or Celsius.

Pumps are available for all winery needs. TCW assembles transfer pumps with Jabsco pump heads to 80-gpm; with Zambelli pump heads 80- to 125-gpm. Available are Nicolini and Ragazzini piston pumps,

Egretier elliptical auger-fed piston pumps, and Ragazzini peristaltic or tubing pumps. Other pumps: Tri-Clover centrifugal and rotary lobe pumps; Aro, Sandpiper and Wilden air diaphragm pumps; Madden metering pumps; and Aro and Grover air piston pumps.

Crushing and pressing equipment for small to medium-sized wineries include Zambelli destemmer-crushers to 6-tph. Of special interest to many wineries, the Zambelli electric-hydraulic basket press with two baskets, fill one basket while pressing the other (two sizes: 87- or 126-gal).

TCW represents Schenk Filter Systems of Germany who build lees filters for efficient processing of juices (available 470mm to 2,000mm). Schenk also builds plate filters available 40x40cm to 120x120cm, and pressure leaf filters from two-sm to 210-sm.



Control boxes for membrane presses are constructed from readily available domestic components. The flexible program allows for proper pressing of any grape variety or other fruit. Units are individually programmed and can be adapted to many types of presses.

The Compleat Winemaker is located about one mile south of downtown St. Helena. Convenient parking is available. Telephone and FAX-response is available for out-of-town and out-of-state customers.

Please request a catalogue for a complete list of products available.

Contact: Bob Ellsworth or Bill Bartolucci, **The Compleat Winemaker**, 955 Vintage Ave., St. Helena, CA 94574, tel: 707/963-9681, fax: 707/963-7739.

Please see our ad, page 44.

Prospero's Equipment Co. / A.W.S. West Coast

New this year at Prospero's/AWS are the large Milani crushers, Della Toffola presses, and grape handling conveyors. The Milani destemmer crushers are designed for the medium to large size winery that requires a high degree of flexibility and sanitation in their crusher.

By using a separate motor on each mechanism of the crusher, Milani is able to build a machine that is simpler and more reliable. They feature full bypasses for stylistic control and variable speed drive. Beater wands are made of engineering plastic. The crusher body is all stainless steel.

Della Toffola is introducing the new PF series membrane press. This innovative design features a central membrane as opposed to a large bulky bladder. The result is greater press capacity than a bladder. The PF also has 360° drain slots giving twice the drainage surface area of conventional membrane presses. A truly innovative new design.

Della Toffola also is introducing a full line of pomace and grape conveyors for the press pad. These will work with many brands of press.

Prospero/AWS also continue to offer the popular Defranceschi line of membrane presses. These machines are well-known for their ease of cleaning and simple to operate and maintain control system. If you are looking for a easy to use and maintain press, the new improved Defranceschi MO series may be perfect for you.

For more information, contact: **P.E.C.**, 914 Marble Ave., NY 10570, tel: 800/332-2219 or **A.W.S.**, 7714 Bell Road, Windsor, CA 95492, tel: 800/228-0664.

fp Packaging, Inc.

fp Packaging, Inc. offers a complete range of winery processing and packaging equipment from manufacturers known worldwide for quality, technology, and service.

Diemme's AR-series tank presses are available in 1,800L, 3,000L, 5,000L, 15,000L, 26,000L, and 32,000L capacities; all feature state-of-the-art PLC controls for flexibility and reliability. The smaller 1,800L to 8,000L models are built entirely in stainless steel, including frame, and may be ordered with or without optional compressor systems.

All Diemme AR presses include programmable axial feed systems as standard equipment. Optional on 5,000L and larger presses is Diemme's 'Intelligent Program,' a self-programming feedback-based control system which constantly monitors and adjusts the press cycle to maximize yield and quality.

New from Robino & Galandrino is the Fenix, a versatile machine for small to medium applications capable of automatically dispensing and applying PVC, aluminum, polylaminate, or tin capsules. The machine can be supplied to handle *both* thermal shrink *and* spin-on capsules and features mechanical separation for tin or tightly-nested capsules and individual thermal heads for perfect shrinking quality.

In addition to Diemme and Robino & Galandrino, fp Packaging's product range includes: **Cobert** fillers, spinners and conveyors; **Bertolaso** corkers and cappers; **Cavagnino & Gatti** wet glue and pressure-sensitive labelers; **Berchi** cases and uncasers; **Padovan** filtration equipment; and supplies including **fp Portocork** cork, PVC and tin capsules and **Chalufour** French cooperage.

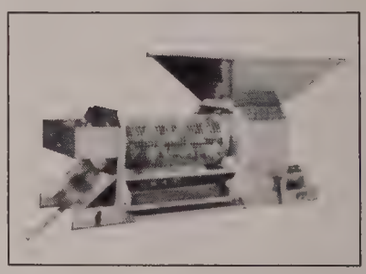
For more information, contact: **fp Packaging, Inc.**, 601 Airpark Rd., Napa, CA 94558, tel: 707/258-3940, fax: 707/258-3949.

Please see our ad, page 56.

Euro-Machines, Inc.

Euro-Machines is a subsidiary of the Scharfenberger Company in Germany, which manufactures the Europress Grape Press and is the exclusive distributor of the Braud Grape Harvesters.

Euro-Machines carries a wide range of vineyard and winery equipment and is pleased with the newest addition: a destemmer-crusher in stainless steel construction built in Austria by the Anton Wottle Company. Small in size (weight of 429 lbs.) and capacity (up to eight tons/hour), but with all the necessities.



The Wottle destemmer-crusher destemms **first** before crushing. The feeding auger conveys grapes to the slow turning destem cylinder. This guarantees an even operation even if filling of the receiving hopper, which is wide enough for grape lugs, is sporadic. The destemmed grapes are crushed carefully by two **adjustable** soft rubber rollers.

The destem cylinder can be easily removed for cleaning or be replaced with another cylinder with a wider screen (this may be helpful for winemakers who handle both vinifera and hybrids.) An optional variable speed motor fine tunes the whole operating process.

The Wottle destemmer can be used as a crusher only. It also has a removable under frame on wheels with a built-in auger to feed a separate must pump.

All of these capabilities, as well as a very attractive price, guarantee careful and reliable work, a long life, and lasting value.

For further information, please contact: **Euro-Machines, Inc.**, PO Box 843, Culpeper, VA 22701, tel: 703/825-5700, fax: 703/825-5789.

Please see our ads, pages 39, 50.

Moon Valley Circuits

The MV1000 Winery Control System is a central monitoring and control system for tanks, refrigeration, and other equipment.

The modular design of the system maximizes reliability and minimizes installation cost, while permitting easy expansion. The MV1000 remote controllers (RPUs) are designed to handle power outages and failure of the computer without compromising control. The computer may routinely be used for other duties.

Tank temperature is controlled to within 0.1°C (typical) using proportional control (PID). Flexible alarms warn of problems. The MV1000 can even warn of coolant loss at an individual tank **before** that tank drifts off temperature. Control of the refrigeration equipment provides energy savings, early warning of impending problems, and easy troubleshooting. History graphs help track trends and troubleshoot problems fast. Everything can be done remotely by phone.

Moon Valley Circuits first got involved with wineries in 1978 servicing presses. Since then, we have provided field service and rebuilds on presses, bottling lines, and other equipment for many wineries and equipment suppliers. We have built a reputation as the one to call when the electricians are baffled. Call us next time you have a 'stumper.'

For more information, contact: **Moon Valley Circuits**, 12350 Maple Glen Rd., Glen Ellen, CA 95442, tel: 707/996-4157.

Please see our ad, page 54.

Pechiney Cork & Seal of California

S.T.B. Plastiques, represented in the United States by Pechiney Cork & Seal of CA, (P.C.S.C.) manufacturer of the bidule 'Securit' now follows systematically, and is able to supply histograms of the dimensional tests it performs during fabrication. This is a big advantage in terms of quality control. The consequences of failures during bottle fermentation can be enormous, and offering quality control proofs is essential.

Manufacturing of the bidule 'Securit' requires critical care in choosing suppliers of the untreated polyethylenes, low density, proof of its alimentary quality, and equipment to guarantee consistent dimensions at the molding stage.

After injection and cooling, the bidules are checked separately on a computerized control unit. Analysis of the dimensions are treated statistically on a histogram which will then be posted on each pallet, stating precisely the production gaps (mini, nominal, maxi, and standard gap).

S.T.B. Plastiques has produced the brand new 'Barbidule' which brings an improvement in the control of the bottle fermentation process. To the bidule is added a graduated clear tube in which the wine, in its second fermentation, will visibly go in as the pressure inside the bottle increases.

Easy to use and very convenient, it gives a visual indication of the pressure level during fermentation by reading the graduations, and is therefore of great help to the cellar master. The 'Barbidule' is used alternately with the classic bidules with a frequency varying upon the conditions of the production (volume of cuvee, storage conditions). It can also be used on a fully automatic disgorging line, without manual intervention.

P.C.S.C. are agents for: the Magnum membrane press built by Oeno-Concept (formerly Station Oenotechnique de Champagne); and bottling equipment built by Perrier (rinser), Scoma (filler) Thierion (conveyor). Valentin (corker/wirehooder), Champagel (neck freezer, bottle handling), and Stentz (bottle washer).

P.C.S.C. can provide capping solutions for R.O.P.P. screw cap (Stelvin® type and others). P.C.S.C. is agent for Station Oenotechnique de Champagne–Martin Vialatte, Oeno-france, Institut Oenologique de Champagne, offering a complete range of chemicals for still and sparkling wine, including IOC yeast created and patented by Institut Oenologique de Champagne.

For more information, contact: **Pechiney Cork & Seal of California**, 5425 Napa-Vallejo Hwy, Vallejo, CA 94589, tel: 707/257-6481, fax: 707/257-8028.

Western Square Industries

Western Square Industries Inc. manufactures portable wine barrel racks, grape harvesting containers, and steel trailers for the wine and vineyard industries. Western Square Industries have sold their products in the U.S. and overseas since 1985.

Western Square has introduced a new trailer for the 'Valley System' which is specifically designed to give the vineyard manager with narrow rows an opportunity to stay with his investment in the Valley System. The company showed a prototype of the trailer at the 1993 ASEV Exhibition and are now prepared to ship in quantities.

"We sold a handful of these narrow trailers last summer," says Trygve Mikkelsen, vice president of marketing. "Based on customer feedback, we have now finalized the design. The trailer has a small stepping board on the back, tapered at the corners for minimum turning radius. We also added a small stepping board to the front of the trailer to accomodate the picker's need to reach inside the two-ton bin."

This trailer also takes two 4'x4' bins and can be ordered with an optional hard plastic strip which enables these bin users to slide the two bins off without help from a forklift or other expensive equipment. In this configuration, the new trailer can be used interchangeably between the valley system and the ½- or ¼-ton plastic bins.

"We also offer a new unique solution for the sparkling wine vineyard manager and others with extremely narrow rows where trailers and tractors cannot get through," says Mikkelsen. "Western Square was approached by some vineyard managers to manufacture a lightweight hand-trailer for the individual picker using small rectangular plastic containers. A prototype of the hand-trailer was exhibited at WineTECH in San Jose, January 1994. Anyone who uses these individual containers while picking grapes, will benefit from this product."

For more information, contact: **Western Square Industries Inc.** tel: 800/367-8383, 209/944-0921.

Please see our ad, page 47.

SOIL ORIGIN

Nature of the beast

By Michael Porter,
Vineyard Consultant

The following briefly describes how soil forms, some of its resulting characteristics, and some general viticultural implications. Subsequent reports will address more specific aspects of irrigation, vine nutrition, fertilization, soil management, and long-term planning.

Though this information emphasizes experience in the North Coast viticultural district of California, specific comparisons with other grape-growing regions around the world are included where appropriate.

An old North Coast grape-growing tradition holds that we think about and manipulate only the above-ground portion of the vine, as we are "often forced to accept what the subsurface environment provides." Those of us not bound by such fatalism have found, through experimentation and analysis, practical ways to significantly improve the subsurface environment, where desired, through management of nutrition and water. We evaluate success in terms of wine quality, or yield and quality.

In order to favorably manage soil, we must first understand the medium in general and then the specifics of a particular site. Remember, variation in soil will make a given approach to nutrient management that may be very successful in one location fail miserably in another. All dirt was not created equal!

Soils in the North Coast are as complex as any in the world, so it is instructive to review the origin and nature of this region's *terrior*.

Soil formation

Mineral soils are produced by the decomposition of rock. (Organic soils, formed in swamps and bogs, represent a very small fraction of vineyards worldwide and are not discussed here.)

Rock breaks down slowly via chemical, physical, and biological weathering processes. Upland soils form in place from weathered rock; their physical and chemical nature is determined by the types of rock decomposing. The underlying geology profoundly influences the soil characteristics of a site in a great many ways. As we shall see below, this may be the predominant factor in establishing the axiom that 'hillside vineyards' produce wines of outstanding quality. It is not the hillside *per se* that is vital, but rather what the hill is made of!

Rainfall and runoff erode upland rocks and soils, carrying them down to the valleys. As the water subsides, the eroded material settles at the bottom of stream channels where the weathering processes continue, often at an accelerated rate. During periods of high water flow, these materials may be deposited near the stream channels by flood waters, thereby creating valley soils, or carried farther downstream. (A great deal of eroded soil ends up in the ocean.)

Upland and valley soils have distinctly different origins. Understanding these differences is important in their management and in the production of fine wine.

Upland geology and soils

The hills and mountains of the North Coast region fall predominantly into four geologic units: the Sonoma Volcanic group (rhyolite, andesite, basalt, and volcanic ash); the Franciscan formation (sandstone and shale); the Merced sandstone; and widely scattered deposits of serpentine.

Comparable complex geology may be found in western Oregon and Washington, Chile, South Africa, New Zealand, and parts of Australia and Italy. (The limestone and chalk so common in France and parts of Spain and Italy are essentially absent on the west coast of the United States.)

Soils formed from the rocks of the Sonoma Volcanics closely resemble volcanic soils throughout the world. At one end of the volcanic rock spectrum is rhyolite (or its coarse-grained equivalent, granite), which is naturally high in potassium and low in magnesium —a mineral balance that is very important for grape nutrition and wine quality.

Rhyolite typically occurs as mixed deposits of well-fractured rock and beds of volcanic ash. It is quite porous, usually well-drained, and forms what are arguably the best viticultural soils in the North Coast. Indeed, many of the 'hillside' vineyards so famous for their superior wine quality owe their reputations to the chemical and physical nature of rhyolitic soils! Examples in Sonoma Valley include: upper Beltane Ranch Chardonnay, Upper Weiss Ranch Zinfandel, and some small Cabernet Sauvignon vineyards whose grapes are blended into Kenwood Winery's 'Artist Series.'

The other end of the volcanic spectrum is basalt (whose coarse-grained equivalent is called gabbro), which is much higher in magnesium and notoriously low in potassium. Basalt is also highly fractured and usually well-drained, but owing to its inherent chemical composition, it commonly weathers into soils that are less desirable because they are nutritionally out-of-balance for premium wine grapes.

Andesite is intermediate between rhyolite and basalt in overall chemical composition, as are the soils formed on it. One well-known andesite deposit occurs in the Chalk Hill American Viticultural Area (AVA) of Sonoma County. Andesitic ash was deposited at such a high temperature that it welded itself into a massive, nearly impervious bedrock with few fractures known as tuff or tuffa. The chalk-like appearance of the ash led to a geographical misnomer — there is no chalk in Chalk Hill!

The impervious bedrock means that winter and spring rains don't percolate, resulting in 'perched' water at the subsoil/bedrock interface and saturated subsoil early in the growing season. This can impede root function at a time vital to nutrient uptake from soil, especially in years of heavy rainfall. It also makes these soils more susceptible to landslide and erosion, requiring great care if developed into vineyards.

The sandstones and shales of the Franciscan formation are typical of the coastal mountain ranges of the western U.S. and have counterparts in the non-

volcanic portions of the Andes. Soils formed on these rocks often have clay subsoils high in magnesium, comparable in many ways to basaltic soils. In a few specific locations, they may be high in lime (calcium carbonate) and lower in magnesium, though rarely approaching the lime content of French soils.

The much softer Merced sandstone underlies much of the Green Valley AVA and nearby portions of the Russian River district. This deposit was laid down several million years ago when the area was a large bay, similar to Monterey Bay today. Analogous deposits are scattered the length of the west coasts of North and South America. Soils formed on such deposits are leached of nutrients; that is, they are nearly inert chemically. Though inherently not as favorable as rhyolitic soils, they qualify as some of the best for producing fine wine as they are readily improved via fertilization.

The bane of viticulture is serpentine, which is scattered through much of the western coast ranges. The only nutrient it contains is 'hydrated' magnesium, which contains only magnesium, silicon, oxygen, and hydrogen. Soils developed on serpentine are typically deficient in most other nutrients (potassium, phosphorus, calcium, nitrogen, etc.) rendering them toxic to most plant species. Very few plant species can survive on such soils; grapevines do not. On serpentine in the uplands, and on valley soils derived from those deposits, vines tend to do very poorly unless fertilization is aggressively pursued.

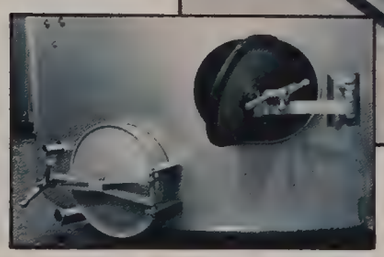
The negative impact of upland serpentine on valley soils should not be taken lightly. Massive quantities of magnesium from serpentine have eroded or leached down from the hills, much to the detriment of many valley vineyards. The net effect of this influx ranges from a detectable chemical fingerprint to a massive footprint.

Valley soil: a marble cake

Where a stream channel emerges from the hills into a valley, an alluvial fan often forms from the particles of rock that the stream carries down from the hills. Near the hills, the particles range in size from boulders and cobbles to silt and clay. Farther from the hills, one generally finds fewer and fewer large particles and a more uniform size distribution of particles. In the North Coast region, some alluvial fans are more than 100,000 years old.

The flatter portions of valley floors generally represent flood plains. When streams overflow their banks, large amounts of sediment can be deposited. Sand and gravel settle out near the stream, while silt and clay settle farther away. During the so-called Ice Ages, the North Coast received far heavier rainfall than today, resulting in some year-round valley lakes in which the predominant type of sediment was clay. These former lake beds, represented today by the Clear Lake soil series, are some of the most problematic for growers and vintners because the heavy magnesium footprint of serpentine diminishes grape quality and productivity.

Fermenting Tanks



Dimpled cooling jackets on fermenting tanks from Santa Rosa Stainless Steel carry a high-pressure flow of glycol, freon or ammonia to ensure continuous, precise temperatures of the wine. Low-pressure channel jackets carrying glycol and water also are available. Santa Rosa Stainless Steel is the industry leader in tanks for fermenting, dejuicing and storage. The wine industry has invested in nearly nine thousand of our stainless steel tanks during the last 20 years. Call today for information or free estimates.

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Fax: (707) 258-0558

Over thousands of years, streams change their courses regularly; a stream will meander all over a flood plain. It is sometimes rather difficult to imagine that a spot miles from the nearest river was, a long time ago, actually in mid-stream! The alternating actions of deposition during floods and subsequent 're-working' by meandering streams often result in complex three-dimensional soil patterns. This change in pattern results in considerable variation in vine growth over short distances. Perhaps the best way to visualize such soil deposits is to think of them as a sort of marble cake of available soil types.

Since valley soils are derived from the uplands, it should not be too surprising that valley soils are heavily influenced by the geology of their respective watersheds. In regard to alluvial fans, this effect is often fairly simple and direct. On the flood plains, it is seldom this obvious, however, owing to this complex history of deposition and re-working.

Due to changes in stream course, a given watershed will contribute sediment to different parts of a valley at different times. Then, to 'spice' things up, volcanic ash gets tossed around from time to time. Some of it ends up in distinct layers in valley soil profiles. (Around 300 AD, a heavy ash deposit covered New Zealand's North Island. It has a major impact on those soils today. People living downwind from Mount St. Helens know all about this sort of thing!) So valley soils generally reflect a mixed and averaged marble cake of the geology of the watershed.

What soil(s) do you have?

The only way to adequately determine what soils you have is to dig holes in the ground, take samples, and analyze them using standardized procedures. You won't learn much from looking at the soil surface or from reading about someone else's soil in a book. Hearsay is often worth what you pay for it, and local mythology is often as useless as it is creative.

Referring to a soil survey can give you a good indication of the kinds of soil found in an area, but don't be surprised if what you find by digging is not what is marked on the map. (This is no fault of those who compiled the survey, merely a result of inadequate resources. It is not feasible for a limited staff with limited funding to evaluate large areas in fine detail. Much of the soil survey work must be done from aerial photos rather than by digging.)

Your best sampling tool is a backhoe, and don't be shy about digging down eight to ten feet if possible. Some very interesting subsoil changes can occur below four feet, so you won't even discover them if you stop at two or three feet. (In New York, you may have to stop at three feet, as that may be as much soil as the glaciers left you!)

Sample topsoil and subsoil separately. If there is a visible change in the subsoil, sample the different layers separately. Soil analysis should be the basis for a great deal of your long-term decision making. Lack of information may cost far more than you 'save' by cutting corners.

In order to compare the results of your analyses with other vineyards and published research, it is vital that the lab you use follows established standard analytical procedures. In California, these standard procedures were developed through the effort and cooperation of the University of California labs and the California Fertilizer Association.

Results from different labs following the same procedures may be compared directly with each other and with (past and future) published research. Numbers coming from labs which follow 'proprietary' procedures cannot be compared with results from standard analysis, rendering them, in my opinion, inferior.

Food for thought

After centuries of trial and error, European viticulturists have long since concluded that *terrior* is a critical contributor to wine quality. In the North Coast, this view is steadily gaining favor, as arcana and anecdotal history give way to basic plant science and modern methodology.

This increased understanding of soil's contribution to winemaking means that the AXR/phylloxera cloud does have a silver lining — our industry has the opportunity to take a hard look at soil types and to use our knowledge as a vital determinant of what materials will be chosen for new plantings and where the vineyards will be located. If we seize this opportunity, we will improve overall wine quality while vastly increasing productivity and profitability. ■

Michael Porter is president of Bob Uttermohlen & Associates, tel: 707/887-7615, which provides soil/water management consultation.

Post bottling hydrogen sulfide and 'corkiness'– ANY RELATIONSHIP?

By C.J. Muller and K.C. Fugelsang
Enology Program
Dept. of Food & Nutritional Sciences /
Viticulture & Enology Research Center
California State University, Fresno

There are few events as disturbing, as potentially expensive to a winery, and as embarrassing to a winemaker, than a recall of wines because of poor quality on the shelf or poor performance in a wine competition. Lately, more and more wines are deemed 'spoiled' by either too high levels of hydrogen sulfide, or, as it is becoming increasingly prevalent, 'corkiness.'

Surely, it is not the intent of anyone to market even marginally spoiled wines. Yet, for reasons which are often beyond the winemaker's control, such wines ultimately reach either the consumer, or, heaven forbid, the unforgiving and often ruthless wine judge who also happens to be a wine writer.

It is the purpose of this report to shed some insight into a few of the chemical intricacies which often seem to work against the best desires of those of us in the wine industry who are entrusted with quality. Surely, not all cases of 'spoiled' wines are explainable by the foregoing concepts; yet in a few, albeit important instances, our thoughts might help explain a growing problem.

Since the decision by the Bureau of Alcohol, Tobacco & Firearms to require warning labels regarding levels of sulfur dioxide and sulfites, there has been a conscious effort by the wine industry to minimize sulfur dioxide at all stages of wine production. The concept, perhaps erroneous, that sulfur dioxide poses a health risk has swept the industry.

A few winemakers have simply opted for no sulfur dioxide additions at all. Some have tried to minimize sulfur dioxide, particularly at crush, while others rely on novel techniques to prevent microbiological spoilage. The net result is that more and more wines are reaching the market with minimal levels of sulfur dioxide and sulfites.

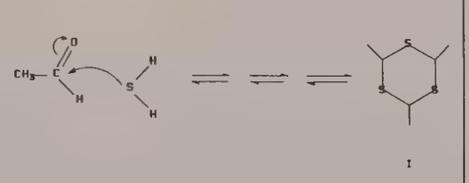
In addition, consumers are complaining more and more about wines, both red and white, which, upon opening, present themselves with the unmistaken odor of rotten eggs. This is, indeed, not a new problem, it has been with us for many years. However, it seems to have been exacerbated as of late, perhaps in relation to reduced use of sulfur dioxide.

In other instances and surprisingly enough, chronologically concomitant with the decline in the use of sulfur dioxide, many wines are being rejected because of 'corkiness.' Truly, the average consumer might not know what this earthy, dusty and nutty note might be, some accept it as part of the 'complexity' of wines. However, consumers are becoming more sophisticated and thus 'corkiness' has become a fault — and an unforgivable one.

The problem seems to affect both white and red wines. Thus, we must also examine some of the subtle changes that have taken place in the methods of processing wines, particularly white wines. It used to be that in making white wines one tried to prevent oxidation (at crush) at all cost. Since sulfur dioxide is now minimally used, winemakers are instead allowing 'controlled' oxidation to take place.

However, in addition to the desired results what you have is, for a short time at least, in intimate contact with the must, oxidized phenolics and other substances, which are, in turn, often darn good oxidizers in their own right![1] Any aldehydes produced therewith are kept preponderantly in the must by virtue of the fact that musts for whites are often cold-settled and the subsequent fermentations carried out at low temperatures. Volatile compounds and gases are more soluble in cooler than in warmer solutions. Physical laws pertaining to this process have not been repealed yet!

Figure 1
Formation of 2,4,6-trimethyl-1,3,5-trithiane (I) from acetaldehyde and hydrogen sulfide



In making red wines, some winemakers have returned to old methods in which open fermentors with abundant air contact, splashing, cap punching and pumping over are the rule. Here again, the process tends to maximize aldehyde formation and subsequent levels in the wine. Yet, sulfur dioxide, whose use is meant here (in addition to color extraction and microbiological control) to chemically tie aldehydes, is again minimal.

Further, because of efforts to minimize production of ethyl carbamate, nitrogen levels are kept at the minimum and thus, particularly towards the end of fermentation, yeast must utilize (in order to survive) sulfur-containing amino acids as a source of nitrogen. Thus, the amino acid cysteine is utilized, and in the process, liberates hydrogen sulfide.[2,3]

The above scenario: high levels of aldehydes, particularly acetaldehyde, hydrogen sulfide production either at the start or towards the end of fermentation; set the stage for the ensuing problem. In reds, it is easy to splash-rack to remove any incipient hydrogen sulfide. In whites, it is not so easy lest by sparging you might lose some of the delicate varietal aroma. But white wines are kept cold, so the solubility of hydrogen sulfide is maximized.

The result is that one has a milieu which is relatively high in aldehydes and hydrogen sulfide. The aldehydes can and do react chemically with hydrogen sulfide in the acid medium of the wine to form, among others, compounds such as 2,4,6-trimethyl-1,3,5-trithiane (Fig. 1) which are less volatile, and sensorially less recognizable than hydrogen sulfide. These compounds are formed early in the process so that, by the time the wine is ready to bottle, negligible amounts of hydrogen sulfide may be detected.

Now, the real problem surfaces. If

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the wines are improperly stored (too warm), acid-catalyzed hydrolysis of compounds such as 2,4,6-trimethyl-1,3,5-trithiane takes place quickly, liberating hydrogen sulfide, prior to sale.

On the other hand, if the wines are stored properly (at temperatures commensurate with their type), such hydrolysis might not take place prior to consumption. However, the 2,4,6-trimethyl-1,3,5-trithiane may still be present. To the keen, trained nose, the notes typical of the compound, namely: 'earthy', 'dusty', and 'nutty' might be apparent. These descriptors are, to some, also indicative of corkiness (?!!)[4], particularly when the wine is otherwise lacking in strong varietal character or complexity.

The reaction for the formation and hydrolysis of this cyclic compound is a delicately balanced equilibria dependent not only upon temperature and pH, but also on other factors. In research at Fresno State, we have both synthesized and isolated 2,4,6-trimethyl-1,3,5-trithiane (there are two isomers) from model systems. Such systems later developed either the unmistakable notes of hydrogen sulfide or earthiness.

Our research seems to corroborate the contention of others that trichloroanisole (TCA) might not be the only culprit when it comes to 'corkiness.' We are currently investigating the kinetics of formation and hydrolysis of 2,4,6-trimethyl-1,3,5-trithiane in model systems and in wine. ■

Acknowledgements: We thank Gordon Burns of ETS Labs, St. Helena, CA for mass spectral analyses. Support of our work by the California Agricultural Technology Institute (CATI) is gratefully acknowledged.

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Tonnellerie Lafitte, guided by consulting master cooper Jean Vicard since 1987, is producing a selection of high-quality Bordeaux barrels using French, Hungarian, or American oak. Tonnellerie Lafitte, located in Cognac, was established around the turn of the century as an 'art' cooperage producing finely crafted miniature barrels and barrel prototypes. Production has been expanded to include traditional size barrels.

In 1991, Tonnellerie Lafitte began to experiment with American oak from several sources and significant variations were discovered in grain density and flavor characteristics, even within the same general area. Production of barrels began from the best selection of seasoned staves.

The goal of ongoing experiments is to create the best expression of American oak in wine, and to evolve a style and technique best-suited for American oak. Tonnellerie Lafitte is adapting traditional French coopering techniques to the unique characteristics of American oak. Experience to date has encouraged them to continue with the following Vicard practices:

- Staves are air-dried at least two, but mostly three years prior to use.
- A similar assembly procedure is used, including fire-bending of staves.
- A long, slow toasting technique is practiced, in which the barrels are rotated over oak fires.

Tonnellerie Lafitte is very encouraged by the initial experiences of winemakers in Bordeaux and the southwest of France. Tonnellerie Lafitte is now beginning to work with California winemakers to continue experimentation with the best expression of American oak and receive further evaluations.

Tonnellerie Lafitte has a limited amount of American oak barrels available for experimentation, coopered in the traditional French style.

For further information, please contact: **Vincent Bouchard,** PO Box 2322, Napa, CA 94558; tel/fax 707/257-3582.

Ramondin, USA, Inc.

After several years of research and investigation at our main plant in Rioja (Spain), Ramondin SA is proceeding with re-tooling in 1994 of the tin capsule manufacturing equipment in an effort to produce tin capsules that have improved spinning performance, even with the most demanding conditions.

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At the same time, Ramondin has standardized the use of hard structure pigments for the inks used on the capsule top, so all capsules will have a major resistance to scuffing during transportation of bottles from the winery.

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Gist-brocades

The Beverages Ingredients Group of Gist-brocades N.V., Delft, the Netherlands, has acquired the enzyme business for the fruit juices, wine and olive industry of Genencor International Inc., Rochester, NY. Net turnover is approximately $5 million.

After an integration of all enzyme activities within Gist-brocades in early 1993, associated with renewed focus on and investments in all important enzyme segments, this acquisition fits perfectly in with the successful development and sales of beverage enzymes during recent years.

The Genencor product range and application technology for the fruit juices, wine and olive industry are fully complementary to those of Gist-brocades. Through this acquisition, Gist-brocades will strengthen its strategic position on the world market, especially in the USA and South America.

Duarte Nursery Inc.

Duarte Nursery (Hughson, CA) has added two field representatives to their staff.

Stephan Daniels joined Duarte Nursery in August, 1993 as a field representative to provide sales and service to the coastal winegrape counties: Mendocino, Sonoma, Monterey, San Luis Obispo, and Santa Barbara. Daniels was raised and educated in Germany, receiving a degree in Viticulture and Enology from the Viticulture and Enology Institute of Weinsburg, Germany. Daniels has worked with and advised several well-known German wineries. He settled in California in 1988 and has worked for several prominent wineries.

Markus Bokisch

Stephan Daniels

Markus Bokisch has joined Duarte Nursery as a field representative to provide sales and service to the following counties: Amador, Calaveras, El Dorado, Lake, Napa, Sacramento, San Joaquin, Solano, and Yolo. After receiving a degree in Plant Science from U.C. Davis, Markus Bokisch served as a viticulturist at Joseph Phelps Vineyards in Napa Valley from 1989-1991. Bokisch consulted for Codorniu in Spain for 1½ years. He has studied at the Wine and Viticulture Institute of Bordeaux and Montpellier in France and did extensive research in Italy, Germany, Portugal, and Switzerland.

To reach Daniels or Bokisch, please contact: **Duarte Nursery Inc.,** 1555 Baldwin Rd., Hughson, CA 95326, tel: 209/531-0351, fax: 209/531-0352. ■

Mechanical weeding in the vine row

By Richard L. Camera

Mechanical weeding in the vine row is being done in many vineyards in place of residual herbicides. However, the decision to use mechanical weed control in the vine row should not be made quickly.

Discs, tillers, rotary weed heads, mowers, and weed bars can all be used. Each has its own strengths and limitations. Some machines deal better with certain soil conditions than others. Some have a choice of heads that can be used on the same machine.

Most machines have automatic sensors or a tripping mechanism of some type to move the tool in and out around each vine. Some have manual controls which can be used to override the sensor. This is important when weeds are large enough to activate the tripping mechanism. The choice of equipment and technique must match the site and conditions just as precisely as the rootstocks.

The large array of machines available all rely on only a few basic ways to kill weeds mechanically.

Uprooting and moving the weeds

Some devices, such as a hoe-plow, uproot weeds. This moves a lot of soil along with the weeds, and indeed, that is why it is very effective, even with large weeds. It requires throwing the soil back later into the vine row. When properly timed, returning the soil can also suppress weeds.

Other machines employ the same concept as a hoe-plow to remove weeds, but use a rotating head with teeth or tines. These machines generally are faster than a hoe-plow, and can be adjusted to move more or less soil, according to the conditions.

These machines all uproot the weeds and place them in the tractor row to be disced under. Ideally, by the time you want to throw the soil back, the weeds have decomposed into the soil and are gone. Throw-back is often done as part of the normal discing in the tractor row or can be done with special border discs for this purpose. Some of these tools can do their own throw-back.

Undercutting the weeds

This method of weed control uses a weed bar which is a knife or bar drawn along a few inches under the soil to undercut the weeds.

Knives of various sizes, from 14-inches to 24-inches long, can be used to match your vineyard needs, providing more or less weed control area. Weed bars are very good if you are in a no-till situation as they do not move soil into the tractor row and do not require throwing soil back. All undercutting efforts are most effective under less severe conditions: lighter soils, small weeds, no bermuda grass. Generally, repeated passes during the season are required to be effective.

Mowing down the weeds

In no-till situations, mowing is the preferred method of weed control. Under-the-vine mowers go around the vines and simply mow down weeds.

Other mower heads are available which come mounted on each side of the mower and have state-of-the-art sensing systems which enable them to retract around each vine. These machines are generally under-powered for heavy weeds in the early spring, however, and do not work effectively because the sensors mistake large weeds for vines and don't cut them.

A combination approach

The weed and soil conditions early in the season are usually very different from those in mid-summer. Some vineyards require a different approach and tool for each situation.

In 1993, I applied alternate row culture (where one aisle is disced and one aisle is no-till) and used a combination of approaches to control weeds. The advantages to this technique are very site-specific, but it has allowed me to use the tools that are best-suited to each situation.

I first drove the tractor in the disced aisle with a Weed Badger under manual control to work on large weeds in the vine row, where it is capable of 80% to 90% weed control doing only one side of each vine row. Later, I drove down the no-till aisle with a Clemens and caught the island of weeds left behind the stake by the Weed Badger, as well as other weeds. The Weed Badger essentially cleared the large weeds out of the way, allowing the Clemens to operate on summer weeds.

Questions to ask before tool purchase

1) Which method(s) do I want to use?

Which method you will choose depends on several factors. Is the vineyard cultivated till or no-till? What limitations do the soil, rocks, and other conditions present? What you decide will depend on your site.

2) What are the largest weeds I can expect to remove?

Large weeds do limit the automatic sensing systems which move these tools around the vines. They are, at their most sophisticated, electronically-controlled hydraulic systems. They almost all have some type of rod or bar which is designed to contact the stake and, in turn, activate an electronic switch that opens a hydraulic valve and initiates the retraction and extension of

the weeding tool.

Most mechanisms are easily defeated when weeds are large enough to trigger the sensor. Only a few have an effective manual override which allows the operator complete freedom, regardless of the weed growth.

3) What type of tractor will power this unit?

It is important to know the exact method by which the tool will be powered. Consider carefully whether your tractor will be compatible before you purchase the tool. Some tools have their own self-contained hydraulic systems powered by a PTO-driven pump. Some use the tractor's hydraulics, and some use both. Some tractors have hydraulics which make them more or less able to power these different tools.

Some tools will require some electrical power from the tractor.

Many of these tools offer a choice of mounting location: front-, mid-, or rear-mount. You will have to live with this decision and it should be discussed with the equipment representative. Some of these tools operate automatically and need not be watched at all, but I prefer to see the tool in action from the driver's seat without turning around. Therefore, I favor mid- or front-mounted tools.

I like to use both ends of the tractor, if possible, and to mount weeding tools in combination with a mower or discs pulled behind the tractor. This is especially important when large acreage is being farmed and it is critical that tractor time be used efficiently. When I use a front-mounted double Clemens, I have a mower on the three-point. When I use front-mount border discs, I have a pull disc behind. When I use a Weed Badger (rear-mount), I have a border disc on the front.

4) How much space is there in your vineyard?

Whichever tool you choose, you will have to accomodate the vineyard layout. If you are establishing a vineyard layout to incorporate mechanical weeding, distance the rows so as to maximize efficiency of the equipment. Choose a tractor which best matches the method and the tool(s) you want. This inter-relationship of the vineyard dimensions to the tractor/tools can be critical to the success of the cultural practices.

Most mechanical weed-control techniques require moving soil back and forth in the vine row. If the vineyard avenue is narrow, there might not be room to turn a tractor with front- and rear-mounted tools. High-density planting (narrow row width) will limit the distance that a tool can extend beyond the tractor and may preclude the use of one method or another.

It is important to recognize that speed for most operations will be reduced as the row width narrows. With less room to wander down the row for mowing, discing or whatever — the slower you must go to avoid tractor blight. Since doing more than one task at a time requires slower speeds, it makes sense to combine operations in closely-spaced vineyards, where speed is already re-

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duced. This can cut costs dramatically, while allowing mechanical weed control.

5) Is one tool going to be enough?

Will you achieve the weed control you want with only one tool? Some tools can serve you well on their own. The Weed Badger, for example, deals with weeds of all sizes. Depending on the acreage, it could be the only tool you need. The Clemens, on the other hand, does not work well on large weeds or where weed growth will interfere with the trip bar. It is recommended for two to three passes in the late fall, early spring, and summer as a weed control program.

6) What options should I get?

Each tool offers options that may provide you more control. These help fine-tune the tool's use, and ultimately give you better weed control. Get a good explanation from the dealer or manufacturer directly as to what each option does, then see if it is needed.

The Weed Badger and Clemens, among others, for example, can include an optional tilt control to allow for weeding on side hills where one row of vines is above the tractor and the other is below the tractor. This option is crucial in all but the flattest vineyards.

Other considerations

Consider the following factors when deciding to use mechanical weed control:

First, if you have been using herbicides for many years, you may underestimate the amount of weeds to expect once you switch to mechanical control. I have found that the area under the vine, once disturbed, becomes more attractive to weeds and may present a bigger challenge than you may anticipate. You have taken what was a dead zone under chemical control and made it alive again. This will increase the overall health of the soil but will also grow better weeds.

Second, the size of the vineyard should influence how you choose weed control tool(s). Obviously, the economics will be better if you can use the equipment over more acres. However, with a large acreage, you can tie up a tractor for many extra hours on weed control if you choose a tool that is not well-matched for your conditions.

Third, if you have drip irrigation with an emitter at the base of the vine, you might consider moving the hose to place the emitter between vines. Most tools have a weakness directly around the stake/vine. The tools depend on the sensitivity of the sensing rod. Don't encourage summer weeds where they are the most difficult to control. Moving the emitter between the vines will foster summer weeds that come with irrigations to grow only where these tools can do their best. It also may benefit the vines by giving them a better wetted area than just around the stake.

Fourth, remember to consider the effects of changing soil types on mechanical weed operation, and the ease with which settings can be changed in the vineyard. A setting that results in optimal weeding in sandy loam may not do the job when you reach a heavier, dry clay loam. Also, rocks buried or on the surface can intefere with weeder operations or damage equipment.

It may take more than one year for you to feel comfortable about your weed control practices using these tools. Gone will be the "spray-it and forget-it" days. You will be forced to become a better farmer as you have to closely observe the conditions throughout the year and respond to them. Gone also will be the times when failures in chemical control will defeat you, because you will get several chances to weed mechanically per season.

Best of all, I have felt better about my success in reducing chemical use in the vineyard than almost any other problem I have had to overcome as a grower! ■

(Richard Camera gained much of the above experience while managing a vineyard in the Carneros district of California. Camera is now director of vineyard operations for the Hess Collection on Mt. Veeder (Napa Valley) and Monterey County.)

Mechanical-weeding equipment

Clemens Radius Weeder

The Clemens radius weeder is utilized as a complete replacement for in-row chemical weed control. It uses a 24-inch knife, operating one inch to six inches below the soil surface to cut through and destroy the root system of weeds and grasses (other knife lengths are available).

In most operations, a mechanical sensor rod contacts the grape vine, thus initiating retraction of the knife to protect the vine. Due to the unique design of the Clemens radius, the sensor will stay in contact with the vine to provide cultivation very close to the vine as selected by the operator.

For new vineyard plantings, the optional ultra-sonic radius uses a sonic beam rather than a mechanical sensor so there can be no damage even though the vines are super-sensitive.

Due to the hydraulic design by Clemens, the units operate at speeds up to 6 mph, without building up heat in the tractor hydraulic system. Only 1.5 gallons/minute is required for each radius being operated from the tractor hydraulic system.

Mounting of the Clemens units can be in front, at the side, or on the rear 3-point hitch of almost any tractor used in a vineyard.

Clemens offers units for in-row tillage only or units that fully cultivate the space from the middle of one row across to the middle of the next row.

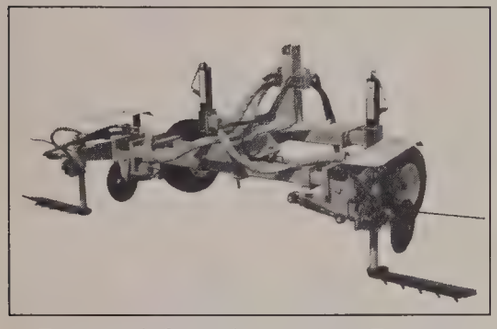
All Clemens models are adjustable for row width, berm angle, and depth control to assure complete weed control when used two or three times each year.

To locate the nearest Clemens dealer for more information, contact: KEM Equipment Inc. 10800 SW Herman Rd., Tualatin, OR 97062, tel: 503/692-5012 OR KEM Equipment Inc., 2775 E.Malaga Ave.#108,

Fresno, CA 93725, tel: 209/442-6099.
Dealer inquiries are welcome.
Please see our ad, page 7.

Gearmore Inc.

Gearmore announces a new line of 3-point hitch in-row cultivators. These quick on-and-off cultivators plug into the tractor remotes for easy installation. They are available in single- and double-row configuration for vineyard row widths from seven to 12 feet. At speeds up to 5mph, the automatic sensors retract the blade when passing vines and the blade immediately returns to the working position. This is an environmentally safe answer for effective berm weed control.



For more information, contact: **Gearmore, Inc.**, 2260 Pomona Blvd., Pomona, CA 91768, tel: 800/833-3023.
Please see our ad, page 5.

Kimco Mfg., Inc.

Kimco Mfg., Inc. has just introduced a new doubles version of its Model-9300 In-Row-Tiller. This allows a tiller to be mounted on each side of the tractor to work two rows at once, allowing the operator to cover over twice the acreage per day as with a single side-unit.

Specifically designed for the larger grower, the Kimco doubles maintains all the durability and function the Model-9300 is known for:

1) Ability to closely follow the vine regardless of ground speed.

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6) Increased ground speed.

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9) Able to work any time of year under any weed conditions.

10) Can be used in conjunction with other tools.

The Kimco doubles, in addition to its standard single-side tiller and its narrow-row front-mounted tiller, now covers the complete spectrum of tillable vineyards from the very narrow row up to the large acreage operation.

With the advantages of cultivation such as: 1) soil aeration; 2) removal of weeds and debris from the vine row; 3) drastic reduction or elimination of herbicides; 4) reduction of government paperwork and permits; and 5) very cost-effective; Kimco now offers the equipment for all sizes of vineyards.

For more information, contact: **Kimco Mfg., Inc.** Fresno, CA, tel: 800/356-9641, fax: 209/277-9358.
Please see our ad, page 43.

Weed Badger Division

"Products to profit people and the planet" is the mission of the Weed Badger Division of Town & Country Research & Development, Inc. In-row cultivation is the focus and specialty of the company. The company has 15 years of experience producing in-row tillers and mowers for the international vineyard industry.

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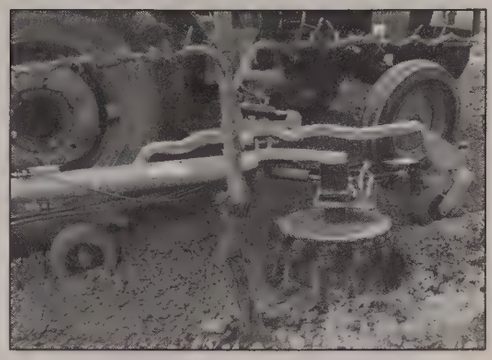

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Resolutions of the O.I.V. 73rd General Assembly

More than 500 growers, producers, scientists, and government officials from 34 wine-producing countries around the world attended the 73rd General Assembly of the International Office of Vine and Wine (O.I.V.) August 29 to September 3, 1993 in San Francisco, CA.

All but one of the following resolutions were adopted during the meeting:

O.I.V. Viticulture Resolutions

——Viticulture Resolution 1/93——

Methods of Soil Conservation Viticulture Resolution 1/93 is intended to heighten awareness among O.I.V. member countries of the need to research and develop methods of soil conservation (such as permanent cover crops and mulching) as alternatives to chemical-based methods of weed control.

The alternative to totally chemical weed control must guarantee conservation of soils against erosion, while permitting the attainment of the following fundamental objectives:

- control of vigor and yields;
- improvement of quality and sanitary state of the fruit;
- facilitation of cultural practices, manual or mechanized;
- economizing on the use of fertilizers and treatment products.

——Viticulture Resolution 2/93——

Criteria for delineating Vitivinicultural Zones and Regions

Viticulture Resolution 2/93 asks member countries to stimulate scientific research on methods to define naturally distinctive homogenous grapegrowing regions that are capable of yielding grape and wine products of high quality; and to investigate all factors in vineyard ecosystems that affect the maturation and quality of the fruit.

——Viticulture Resolution 3/93——

Vine Physiology

Viticulture Resoluiton 3/93 calls attention to the need for further study of the relationship between grapevine vigor, productivity, and fruit quality and declares the intent to organize a fifth OIV-sponsored symposium on this subject in 1995.

——Viticulture Resolution 4/93——

Table Grapes

Viticulture Resolution 4/93 recommends to member countries that table grapes be regulated separately from wine grapes (as in the U.S.); that more attention be given to production and marketing questions that are unique to the table grape industry, and that collections of table grape varieties be made more widely available to interested scientists.

—— Viticulture Resolution 5/93——

Techniques of Vine Propagation

Viticulture Resolution 5/93 recognizes certain significant advances in vine propagation techniques (in vitro culture, greengrafting, production of herbaceous and woody cuttings in the greenhouse, etc.) and calls for revised regulations regarding certification of grapevines that would incorporate these new techniques as they are mastered. This resolution is directed only to those countries (notably the European Community) where such regulations currently exist.

——Viticulture Resolution 6/93——

Reduction of chemical treatments in vineyards

Viticulture Resolution 6/93 recommends that member countries support research on viticultural systems that are less reliant on chemical pesticides; to specify, to the extent possible, maximum limits of chemical residues on grapes and in vine poducts; and to promote these systems in accordance with international standards.

O.I.V. Enology resolutions

——Enology Resolution 1/93——

Applies after adoption of the "International Enological Codex".

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Concentration by reverse osmosis (concentration of must by water removal); Procedures to avoid the formation of foam (prevention of foam formation during fermentation to avoid loss by overflow and permit better use of fermenting vat capacity); Tartrate stabilization by electrodialysis (obtain tartrate stabilization by means of an electric field and semi-permeable membranes); and Tartrate stabilization by treatment with cation exchange in the hydrogen form (through means of a polymerized resin ion exchange column).

—— Enology Resolution 2/93——

This resolution introduces into the International Code definitions the following procedures: Controlling the level of sugar in winegrapes (increasing natural sugar levels through factors such as soil, climate, variety, clone, rootstock, planting and vine management); and Controlling the level of sugar of harvested winegrapes (increasing sugar levels by practices such as natural raisining, forced ventilation, selective sorting or freezing).

—— Enology Resolution 3/93——

Nutrition and Health

Enology Resolution 3/93 recommends the establishment of a fourth commission on health research and education to be studied for monitoring developments and distribution of information on objective medical and scientific research concerning the health implications of wine consumption, and to disseminate this information widely to the medical profession, governments, and consumers.

—— Enology Resolution 4/93——

The resolution reduces the suggested maximum level of lead in wine from 300 parts per billion to 250 ppb.

O.I.V. Economics Resolutions

—— Economic Resolution 1/93——

Ageing of grape-based spirits beverages

Economic Resolution 1/93 seeks to harmonize the rules governing the ageing and labeling of grape-based spirits beverages to maintain high-levels of quality and avoid consumer confusion.

—— Economic Resolution 2/93——

The resolution recommends that member countries promote the cultural heritage and diversity of wine through a public information campaign focusing on geographical origins, the cultural value of the vine and its products, its role in civilization and its historical links

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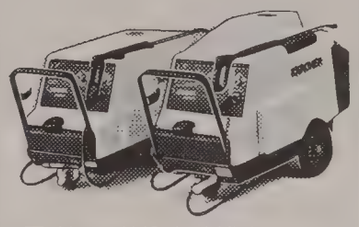

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——**Economic Resolution 3/93**——

Conditions under which the word wine may be used.

Economic Resolution 3/93 was ***not*** adopted; to be decided on at next General Assembly. It prohibits the use of the word 'wine' as a stand-alone descriptor, and limits use of the word 'wine' in combined form only to existing products (i.e., a 'grandfather clause'), when the product does not conform to the following definition: Wine is exclusively the beverage resulting from the complete or partial alcoholic fermentation of crushed or uncrushed grapes or grape must. Its acquired alcohol content may not be less than 8.5% by volume (or 7% by particular legislation in the region considered when taking into account special conditions such as climate, soil, grape variety, or vineyard traditions).

——**Economic Resolution 4/93**——

International standards for the labeling of wine.

Economic Resolution 4/93 provides for mandatory alcohol content labeling with a tolerance of 0.5% by volume in normal circumstances and 0.8% by volume in special circumstances; the use of 'lot coding' systems to permit identification of specific quantities or vats of wine; and harmonization of descriptive terms for wine ranging from dry, to medium-dry, to medium-sweet, to sweet.■

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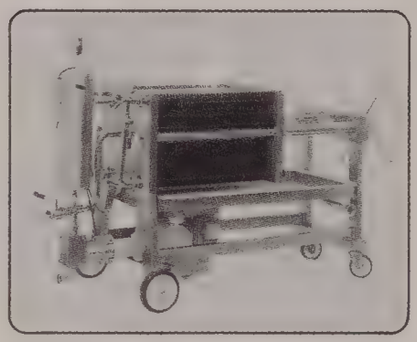

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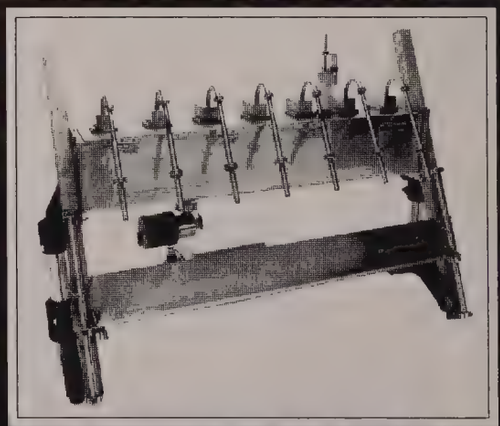

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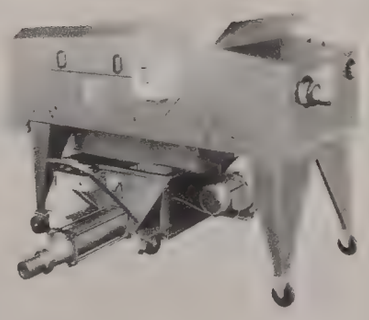

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By Dr. Richard Smart

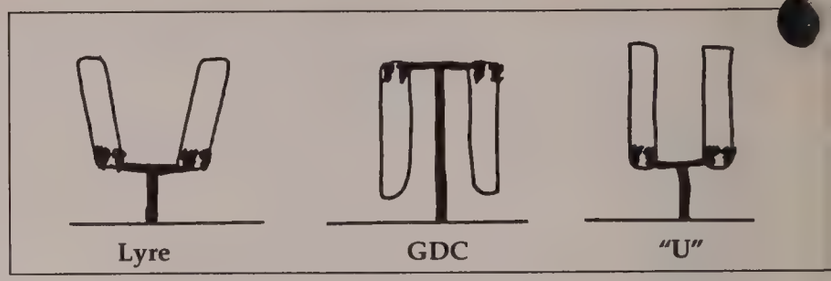
PART II

Choosing a trellis system

In the previous column (Jan/Feb'94-***PWV***, I discussed the importance of thinking about vineyard design before beginning to plant. Specifically, the criteria for choosing proper row and vine spacing were discussed, and the importance of location of posts and wires.

Which trellis system?

Many growers find the maze of trellis systems incomprehensible. It does seem baffling at first — a mixture of names referring to people (like Scott Henry and Smart-Dyson), or places like Geneva (New York). Others derive from another country and language, like Te Kauwhata (New Zealand) and Sylvoz (Italy), or musical instruments like the lyre, or how the vines are trained, such as Vertical Shoot Positioning (VSP). No wonder some growers still feel more comfortable planting 12-feet x 8-feet with a stake at every vine, and cordon training.



I want to try to distill the choice of trellis systems down to a few basic principles. But first, we need to come to grips with the terms and names. This is not as difficult as it may seem, if we can understand why and how these systems have been developed by different people in different places.

We can think of trellis systems as being of several basic types (Figure 1). Detailed descriptions of these trellis systems, and their origin, application, and construction may be found in the handbook "*Sunlight into Wine*" (available from ***PWV*** -Bookshelf). There are a few other trellis systems in use, but the ones I discuss here are those being used most commonly.

The common California system (often called the 'California sprawl') and the Sylvoz system are non-shoot positioned, whereas most of the other systems, (for example VSP and lyre), are shoot-positioned. (The lyre system is sometimes also called the U-system, and in California, it has been incorrectly called the

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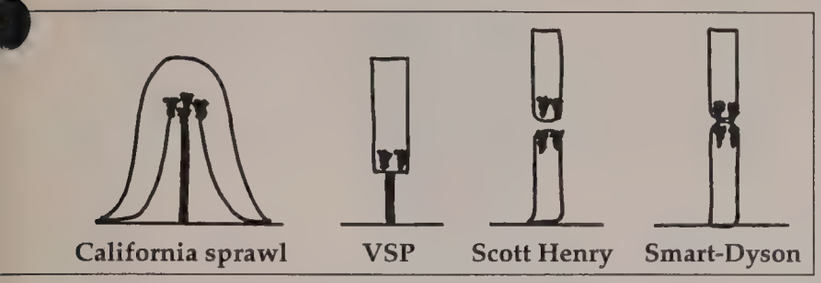

quadrilateral cordon system or 'quad' for short.)

Shoots may be positioned all up, like the lyre, or positioned all down, like the GDC (Geneva Double Curtain), or positioned both up and down like the Scott Henry and Smart-Dyson. Canopies can be horizontally divided, as in the GDC and lyre systems, or vertically divided, as in the Scott Henry, Te Kauwhata two tier, and Smart-Dyson.

Within limits, all systems can be cane-pruned or spur-pruned (cordon-trained). Spur pruning is generally preferable because it allows for spurs to be correctly spaced in the formative years, and consequently shoot spacing (important in affecting canopy microclimate), is easily controlled. Spur pruning is also easier to mechanize. While many Californian growers are not thinking about this now, they will be in the future.

There are three major considerations affecting choice of trellis systems: vineyard vigor, row spacing, and mechanization. There are also several minor ones to be discussed later. Let us begin with the major ones.

Trellis systems and vine vigor

A general principle is that *high vigor vineyards need larger trellis systems.* Larger trellis systems have a larger canopy surface area, and are able to expose leaves and fruit well to the sun without crowding and shading.

Low vigor vines will not have the growth capacity to occupy large trellis systems, and the money spent on them will be wasted. A simple assessment of vineyard vigor is determined by calculating the weight of winter prunings per foot of vine row. A high vigor vineyard might have 0.9-lb/ft or more, a moderate vigor vineyard around 0.4-lb/ft, and a low vigor vineyard 0.2-lb/ft or less.

Here are some guidelines for trellis suitability to vineyard vigor:

Low vigor: California standard, perhaps VSP.

Moderate vigor: VSP, Scott Henry, Smart-Dyson, Te Kauwhata two tier, lyre, perhaps GDC, Sylvoz.

High vigor: GDC, Sylvoz.

Trellis systems and row spacing

This is a straightforward relationship. There must be sufficient room down the aisle for all machinery to pass, without breaking off shoots or damaging the trellis. There is now more flexibility than a few years ago. Previously, vineyard tractors used were quite wide (six feet or more) in order to have sufficient horsepower. Now smaller, four-feet wide tractors are available. These tractors come complete with four-wheel drive and all the power required for normal vineyard operations.

Obviously, vertically-divided trellis systems can be installed on closer rows than horizontally divided ones. The guiding principle here is that *the distance between canopies should be no less than their height.* (To calculate this, measure the leafy canopy and not the post. Canopies do not normally extend to the ground, but protrude above the post top. Also, do not forget to allow for width of the canopy, normally about 12 to 15 inches, as a minimum.) If cano-

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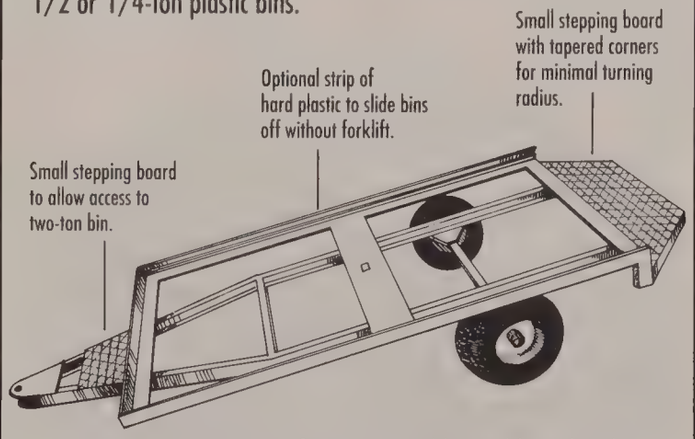
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pies are too close together, they are shaded at the base, and both yield and fruit quality will suffer.

Here are guidelines for trellis suitability to row spacing:

Narrow rows (6-ft. or less): VSP, perhaps Scott Henry, Smart-Dyson, and Te Kauwhata two tier.

Intermediate rows (around 8-ft.): VSP, Scott Henry, Smart-Dyson, Te Kauwhata two tier.

Wide rows (11-ft. or more): GDC, lyre, Sylvoz, California standard.

Trellis systems and mechanization

Increasingly, growers are concerned about mechanization. In California, I find more clients wanting to know about which system can be mechanically harvested, and in Australia there is equal interest in mechanized winter pruning. These are important issues for low-cost and efficient viticultural production which will help make viticulture price-competitive on an international basis.

In the future, I think harvesters will be available 'off the shelf' for all training systems, but for the moment we are in a state of flux. I understand that machines and picking heads are being evaluated or are available in limited quantities for all systems I describe here. It will likely be a few years before all systems could be mechanically harvested. But you can be sure that as the acreage with these systems increases, so will the availability of suitable machines. After all, there is no need to develop a new picking head for these systems, because existing machine configurations can be modified.

Mechanical harvesters are now available to handle these trellis systems: VSP, Scott Henry, Smart-Dyson, Te Kauwhata two tier, Sylvoz, and California standard; but not the GDC or lyre.

All of the above systems can be easily summer and winter-pruned with a simple machine like a reciprocating cutter-bar, although sometimes a dodging device needs to be fitted to avoid trunks (with the Scott Henry).

Other considerations

Some growers like to be adventurous, and the first in their region to use new ideas. Others, and perhaps the majority, would rather watch their neighbor try out new ideas for many years before changing practices.

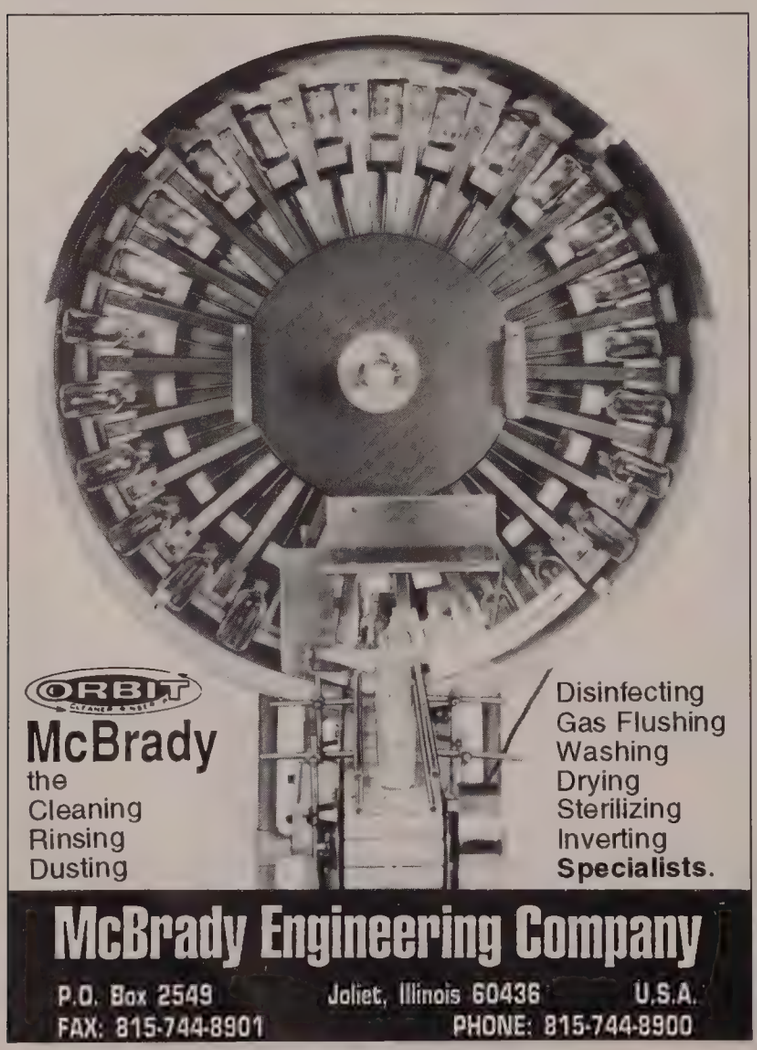
Some growers are concerned about labor supply. For example, all systems employing shoot positioning require about 15 man hours/acre in the period between bloom and veraison.

Other growers want to invest the absolute minimum amount of money in a trellis system, although experience shows that there is a good return on trellis investment.

Some growers are concerned with the vineyard aesthetics, and 'whether it will look right.' Others are concerned about turning shoots down, as with the Scott Henry, Smart-Dyson, and GDC. This technique is possible and easy (if the timing is right) for all varieties I have tried, except the very erect Mourvedre and Rkazitelli.

Conclusion

To conclude this three-part series, the next column will discuss advantages and disadvantages of these trellis systems. ■



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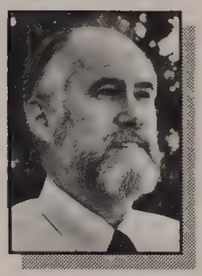

By D.R. Storm, PhD, P.E.

Multipurpose bath oil does it all

The summer of 1993 was one of discovery. Excursions to the ocean and mountains, and boating in California's Sacramento-San Joaquin Delta brought me in contact with every known carnivorous flying insect.

*After a particularly severe weekend defeat at the hands of endless swarms of black gnats (which only appeared to be angered by the usual assortment of commercial repellents), I was introduced to Avon's "SSS," a bath oil that has endless uses — the least important of which seems to be for bathing. Skin-So-Soft, as it is known affectionately among its dedicated followers, **does** repel insects, and I suppose, softens your epidermis.*

The uses for "SSS" number at least 32, according to the printed list that accompanies each 8-oz. plastic bottle. Avon does not, and probably by law cannot, endorse the 32 uses, saying with carefully chosen words that they are uses that have been discovered by Avon customers.

I've depleted my initial stock of three bottles through my own use and by giving them to boaters and fishermen who wanted to try the magic concoction. The Avon-lady also is currently without a supply. Is someone out there trying to corner the market? Can it remove stubborn tartrates from fermentors? I'll check it out as potential use #33.

PART II

Right valve for the right application

Part I (Jan/Feb'94-**PWV**) discussed selection criteria, valve standards and types and valve anatomy for the most commonly used valves in winery process and site utility applications.

***Specialty Valves** (Surge and pressure-reducing valves)*

One of the most complex analyses of pumping systems by design engineers involves the rational determination of pressure surges and surge mitigation by the use of several valve options. Pressure surges (shock waves) are created in incompressible fluids like water when a moving volume of water (as in a pipeline) is abruptly stopped by normal pump cycling, pump power supply failure or rapid closing of a valve.

As no one has ever disproved Newton's law of the conservation of energy (it can be converted but neither created or destroyed), the 'kinetic energy' component of water moving in a pipeline must be converted to 'pressure energy' when the pump stops. This pressure rise is what must be dealt with in properly designed pump stations and pipe networks. If not accounted for in the design, a substantial surge (say 50% above the normal operating pressure) can create hydrodynamic conditions that can cause pipe, valve or other system component damage or failure.

Wineries are most likely to find surge valves in high-lift raw- or treated-wastewater pumps; large flow-rate vineyard irrigation supply pumps; and high-lift, potable water and fire-protection pumps.

Choices available for surge protection are:

a) pump control and check valve,

b) pressure surge relief valve,

c) surge anticipator valve.

a) Pump control and check valves: These valves operate through pressure signals from upstream and downstream of the valve, by controlling the speed with which the valve opens. For example, the pump receives an electrical signal to go 'on' and the pump is energized but the valve does not open immediately. (Centrifugal pumps can operate at zero discharge without damage and are thus the pump of choice for large flow-rate and high-pressure systems.)

Therefore, as the pump control valve slowly opens, the water column can accelerate gradually, thus avoiding the creation of a pressure surge. Upon shut-down, the pump continues to run and the pump control valve closes slowly until it returns to zero discharge. The valve then signals the pump to de-energize, again avoiding surge on the pump stop-cycles.

b) Surge relief valves: These valves are simpler in operation and generally less expensive than pump control and check valves, and open in response to the pressure rise upon pump starting or stopping. For clean water service the valve is operated by a small, short-stroke 'pilot valve' which in turn opens the larger pressure valve. For obvious reasons, surge relief valves generally are not specified for sewage service, because of potential blockage of the small-diameter pilot valve pressure-sensing lines. Other pressure-sensing schemes are employed by some valve manufacturers, so that wastewater solids are not an issue.

c) Surge anticipation valve (SAV): This high-tech device uses a solid-state programmable controller that electronically performs the same function as the pressure signals in the two previous examples of surge valve type. Pressure signals are converted to digital format.

The SAV is a more responsive valve. With a power outage, for example, the controller has anticipated the surge (from the power loss-event) and thus adjusts the valve opening more quickly from the surge yet to be generated. While operating, this valve vents a volume of liquid to the pump wetwell or a separate sump.

This pump's suitability for sanitary wastewater service would have to be carefully evaluated to ensure that the valve discharge did not create a health hazard to workers and repair personnel.

Pressure-reducing valves are employed in potable water systems when gravity or pump-induced pressures are greater than required for nominal winery or vineyard operating pressures of 30- to 60-lbs. per sq. inch (psi). The control of pressure from higher to lower is achieved within the valve body by means of a spring or piston-buffered diaphragm. This throttles the flow sufficiently to produce the desired pressure drop.

Installation of pressure taps for conventional Bourdon-type gauges upstream and downstream from the valve, can permit a ready and continuous monitoring of the valve's performance.

The only failures I've observed in pressure-reducing valves have resulted from age and eventual rupture of the neoprene diaphragm. The valve also may malfunction if a sediment particle or other foreign matter lodges in the seat portion of the valve.

Because each valve is designed for a narrow band of operating pressures, it is extremely important to select the proper valve size for both flow rate and expected pressure range. An undersized valve might restrict (throttle) flow to a point where it would impair the primary hydraulic function of the plumbing system.

Bogus Valves

In every industry, there always seem to be people intent upon imitating an original product. They ride blissfully, but illegally, along on the reputation of the legitimate supplier. Imitation Levis jeans, Rolex watches and Calvin Klein clothing and accessories come immediately to mind.

Thus it was inevitable that unscrupulous valve-refurbishing operators would also try the low-ball practice of upgrading a valve and its rating by only stamping or embossing another valve manufacturer's name on the bogus fitting. Wineries are less likely to be affected than petroleum, electric or water utility companies, who buy thousands of valves with each purchase order. Nonetheless, it is wise to be informed that imitation valves exist in the marketplace.

The imitation valve scam generally is perpetrated with large lots of 'junk valves' bought legitimately from scrap metal dealers. The junk valves are reconditioned (at a very low level; maybe only painting) and then slipped back into the 'new valve' market through unsuspecting wholesale plumbing supply houses at a very low unit-cost. Intentionally mislabelled valves, on the other hand, usually are sold at bargain prices through unauthorized dealers.

The legal ramifications of such practices exceed the scope of this column's abbreviated coverage. But needless to say, just as Levi Strauss acted to remove bogus jeans from the market, the legitimate valve companies have gone after the bad-valve guys with a vengeance. Just as you would avoid the New York City street-vendors hawking Rolex watches, you also must be cautious purchasing valves and other plumbing system components. Know your supplier and I'm sure he will be happy to verify the pedigree of the valves you buy. ■

David Storm is a consulting civil/sanitary engineer, specializing in winery utilities, and the owner of Winters Winery.

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4. "Beware of Bogus Valves and Parts," American Valve Manuf. Assn., August 1990.

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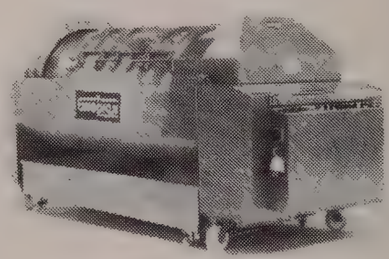

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By Jake Lorenzo

Celebrity

Chuy is pissed. He slams the bottle of Hornitos on the counter, yells, "Pour your own shot, Señor Author," and scurries into the kitchen to pick up another order.

The Burrito Palace is jammed. People actually are waiting in line to be seated. At the table behind me, a tourist dips his chip into the bowl of salsa, takes a bite and screams. His face flushes purple, his eyes bulge, and he rasps, "Water, ... please, ... water." Chuy grabs the pitcher, snakes his way around the crowded tables and fills the guy's glass. "I don't make no money on water, gringo. Order a beer."

Chuy, never a patient man, is frenzied. I marvel as he deftly negotiates his way around the crowded tables, plates of steaming food intricately stacked up his arm. He serves a table, always remembering who ordered what, pivots to the door and seats the next group just as the bus boy finishes his last swipe of the table top. He plunks down some chips and salsa, warns the diners, "El mas macho llora aqui" (the strongest of men cry here) and hurries into the kitchen for the next ready order.

I sadly shake my head, pour a strong shot of Hornitos into my steaming coffee and try to ignore the cacophony of sound. It's my fault, really. If I hadn't written about the Burrito Palace in my book *Cold Surveillance*, if the food hadn't sounded so delicious, if Chuy had not been presented as such a 'colorful' character, this never would have happened.

For two months, the Burrito Palace has been mobbed. I had to stop sitting in my regular stool, because people kept coming over for autographs. Local customers complain loudly, and keep adding habañero chilies to the salsa hoping to drive off the tourists.

Chuy jumps up onto the counter and shouts, "Bastante! Bastante!" The crowd ignores him. He smiles at me, our prearranged signal. I stand up, pull out the .38 and fire a round into the ceiling. Plaster chips bounce off a buxom blond wearing a tight T-shirt exclaiming 'Tequila Hooters' across the chest.

I amble to the door in my best private-eye swagger as Chuy announces, "People, finish your food, and then get out. The Burrito Palace is closed." I flip the sign at the door, and then take my position outside, with gun drawn, in case some of the tourists can't read.

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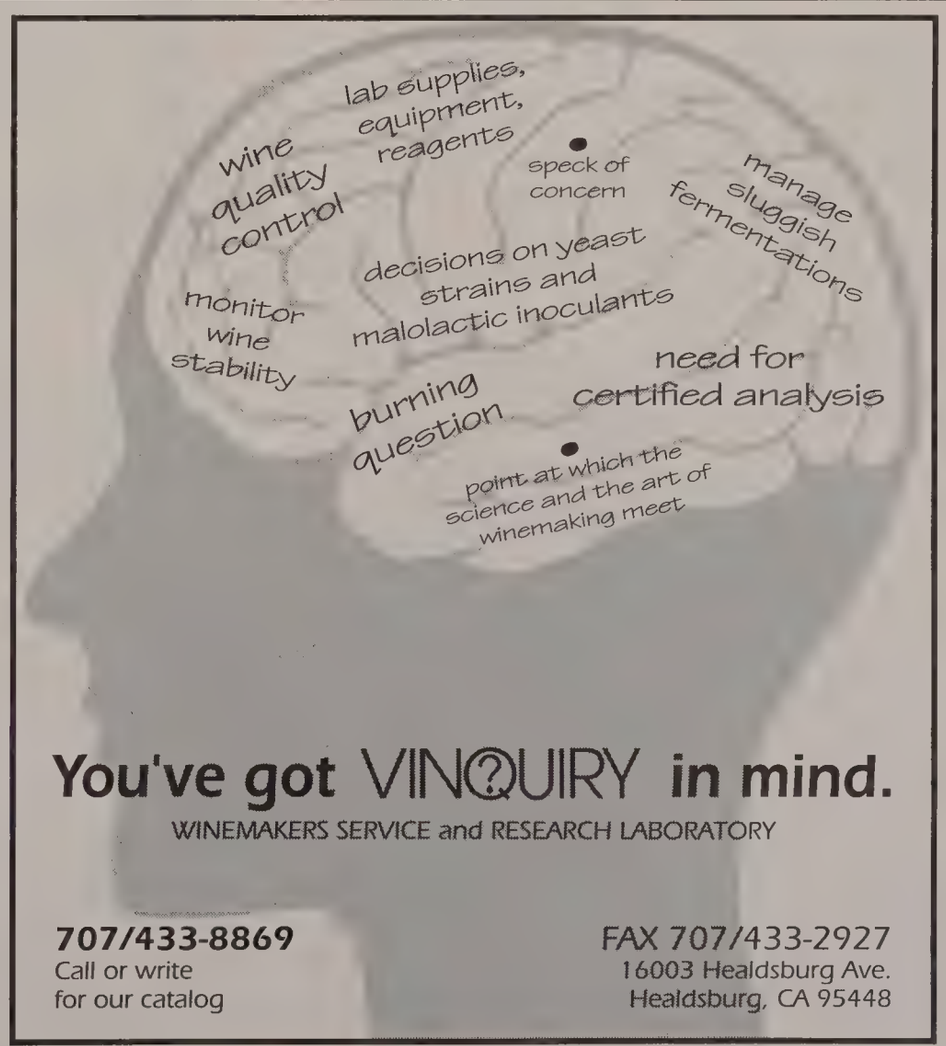
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It doesn't take long. Maybe 20 minutes. I guess people don't like to lolligag over their meals in the face of gunfire. When the Palace is empty, Chuy and I toast each other as we start on a 1991 Williams Selyem Rochioli Pinot Noir.

"Gracias, Jake. Mañana I'm off to the Caribbean. I got mucho dinero, mucho vino and one Hawaiian shirt to last me a month. When I get back, you better be right. All these damn touristas better be gone. I want my business back to normal."

"Don't worry, Chuy. This is America. Celebrity is fleeting."

Not only is celebrity fleeting, celebrity is demeaning.

When Jake Lorenzo walks into a wine shop, in spite of drinking wine every day for more than 20 years, I am overwhelmed by the choices. How could anyone, especially a novice, maneuver their way through this wine jungle? What, in fact, actually causes a consumer to purchase a particular bottle of wine? To tell you the truth, I never figured that one out. It's one of the great unsolved mysteries of Jake Lorenzo's career.

As complicated as a wine shop may be, it's got nothing on a bookstore. Even a small bookstore has hundreds more books to choose from than a good wine shop has wines. A wine drinker may have to decide whether he wants French or Californian, red or white, Pinot Noir or Zinfandel. But a reader of books has to decide between fiction and non-fiction, travel or business, mystery or sci-fi, classics or modern, hardbound or paperback.

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shop, you should watch them in a bookstore. People become garrulous when talking about wine. The only thing people ask in a bookstore is location. "Where is the quantum physics section?" "Where would I find the original Spanish version of *Like Water for Chocolate*?" Wine is still a diversion. Books delineate the limits of our individual literacy.

Now that Jake Lorenzo has written a book, he spends a lot of time in bookstores trying to sell the damn thing. I have been forced to spend time with reporters, trying to interest them in my stories. I have to prove myself attractive to radio hosts, so I can get air time and encourage people to rush to their nearest bookstore to buy *Cold Surveillance*. For the most part it is a humiliating experience.

Reporters and radio hosts don't give a damn about who you are or what you've got to say. Reporters and radio hosts worry about ***their*** customers. They want to know if you are a 'good story.' You're a good story if you're controversial, funny, or can in some way provide film footage of anything in flames.

This is a major problem we have in America. People aren't interested in a person until they're convinced that person is somebody important. It's all relative, of course. Importance exists on a scale. Money skews the scale. If you have enough money, everybody thinks you're important. Celebrity also skews the scale. If you can do something and get recognized for it (*i.e.* acting, playing baseball, making wine, writing a book) people will go out of their way to meet you, be nice to you and give things to you.

This is asinine, and it smacks of bigotry. We should not relate to people based on their press clippings. If we've lost all else, we should still have the confidence to meet people and decide for ourselves whether or not they are worthwhile. Friendship is far too valuable a commodity to entrust to others.

Hell, Jake Lorenzo wouldn't be surprised if right now Marvin Shanken and Robert Parker are teaming up on a new publication: *The Advocate's People Spectator*.

This is a publication that lists people and assigns them a celebrity value based on the 100-point system. It factors in such elements as recognizability, reputation, humor, estimated value (in dollars) and earning potential. Issues are specialized: One issue covers the entertainment field, another features people in the wine business, yet another covers sports figures. Think how handy this will be. Whole groups of people will refuse to associate with anyone scoring less than 90 points.

You think Jake is making this up. Think again. It could happen. In fact, now that they've heard the idea, it's a sure bet. If people are willing to buy their wines based on points, they'd be all too happy to make friends the same way.

More and more it boils down to them and us. I may be stubborn, but I think I'll muddle through on my own. I'll make my own wine choices, with the help of my friendly wine-shop owner, even if I have to suffer through the occasional mediocre bottle. And I'll take my friends as I meet them, no matter who they are or what they do. It makes life more interesting. ■

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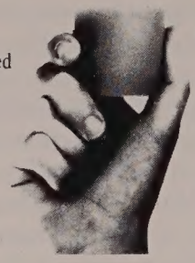

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Encore/Decanter	54	510/234-5670	510/234-0433	Peter Heylin
Enotech	2	415/851-2040	415/851-2034	Peter Klipstas
EuroMachines	39,50	703/825-5789	703/825-5789	Matt Eisner
fp Portocork, Inc.	56	707/258-3930	707/258-3935	James Herwatt
Gearmore, Inc.	5	909/620-6061	909/620-1001	Bob Giersbach
Gordon Graphics	23	415/883-0455	415/883-5124	Gordon Lindstrom
Goverment Liaison	45	800/642-6564	703/525-8451	James Hurson
Gripple	3	800/654-0609	800/654-0689	Joe Shad
Independent Stave	16	417/588-4151	417/588-3344	Ed Larmie
KHS Machines	18	707/763-4844	707/763-6997	Al Burns
Key Industrial	44	707/252-0312	707/252-9054	Buzz Boyanich
Kimco Mfg., Inc.	43	800/356-9641	209/277-9358	Jerry Welker
King Estate Vineyards	52	503/942-9875	503/942-9867	Dave Michul
KLR Machines, Inc.	6	707/823-2883	707/ 823-6954	Ivan Linderman
Knox Industries	48	415/751-6306	415/751-6806	Mel Knox
Lafitte Cork & Capsule	34	707/258-CORK	707/258-0558	Barry Rucker
Mancuso Brokerage	42	415/474-8200	415/474-0849	Karen Mancuso
MacLean Nursery	52	707/255-8874	707/255-4579	F. MacLean
McBrady Engineering	48	815/744-8900	815/744-8901	Kurt Cameron
Moon Valley Circuits	51	707/996-4157	none	Mike Miller
Napa Fermentation	43	707/255-6372	707/255-6462	Pat Watkins
Pickering Supply	54	415/474-1588	415/474-1617	John Pickering
Prulho, Food,Wine	12	707/255-2031	707/253-8234	C. Foppiano
RLS Equipment	45	609/965-0074	609/965-2500	B. Stollenwerk
Santa Rosa Stainless	33	707/544-SRSS	707/544-6316	Rod Ferronato
Scott Laboratories	15,23	707/765-6666	707/765-6674	Bob Moeckly
Seguin Moreau, USA	24	707/252-3408	707/252-0319	Alain Fouquet
Sonoma Grapevines	52	707/542-5510	707/542-4801	Rich Kunde
State Insurance Fund	46	800/773-7667	916/924-6825	Bob Kean
Stavin	53	415/331-7849	415/331-0516	Alan Sullivan
Sunridge Nursery	36	805/858-2237	805/366-4251	Denise Orrick
Tonnellerie Radoux	15	415/457-3955	415/457-0304	Jim Boswell
Tonnellerie Vicard	41	707/257-3582	707/257-3582	V. Bouchard
Vinquiry	51	707/433-8869	707/433-2927	M. McGrath
Weed Badger	10	800-437-3392	701/778-7501	Ron Dalka
Western Square	47	209/944-0921	209/944-0934	John Lansingh
Wine Cap Company	43	415/923-1993	415/928-0690	Dwight Pate

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